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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

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AMBERGRIS PRIZED BUT HARD TO SELL

Ambergris is a wax-like substance from sperm whales, once highly valued as an odor fixitive in perfume.

In earlier days ambergris was worth its weight in gold, but the introduction of synthetic substances caused prices to tumble. Even so the world market price is still believed to be about £40 (US$112) a pound, but the demand is not great and is restricted to a few high-quality perfume manufacturers.

Of hundreds of samples submitted for testing only one or two prove to be real ambergris.

All this stems from the most common origin of ambergris, flotsam and jetsam on the beach where it may be found by anyone. Interest in the search is sustained by an occasional find of ambergris, either in a large chunk or in a multitude of small particles. True ambergris may also be found floating on the surface of the open ocean or lodged in the lower intestines of a dead sperm whale where it originated.

Ambergris may be soft and waxy to touch or rather hard and friable, depending on its age and dryness. It usually can be kneaded in the fingers, and has the consistency of pitch, but is not sticky. In color it is black, grey-white, mottled grey, and black, or brown and yellow, or any combination. It sometimes has an internal structure of concentric layers like an onion, and often has fragments of squid beaks or squid "bone." Its odor is fetid when fresh and dark-colored and musky in a sweet, earthy way when older, drier, and lighter in color.

Tests for ambergris are: melting point, burning properties, fluorescent properties of alcohol solution, hot wire test, and microscopic examination which should reveal fragments of the chitinous beak of squid, and perhaps fragments of the calcareous "pen bone" or internal skeleton of certain species.

One of the biggest pieces of ambergris found in recent years weighed 918 pounds. It was removed from a sperm whale aboard the British whaling ship, Southern Harvester, in 1953.

When the Russian Antarctic whaling fleet called at Melbourne in 1964, several hundred pounds of ambergris was reported to be among whale products aboard the factoryships, including one piece weighing 180 kilos (about 397 pounds). It was stated that the price paid in Russia for ambergris was £A400 a kilo (US$407 a pound).

The West came to know of ambergris through an Arabian merchant who ventured forth to the islands of the Indian Ocean. On the Andaman Islands he traded iron against ambergris, a product that Orientals had long prized as an aphrodisiac. By the Middle Ages, Europeans, too, had begun to use it in love philtres and also as a cure for dropsy and other diseases. As the demand rose while the supply (whose source remained a mystery) lagged behind, prices rose to giddy heights.

Marco Polo, who knew that Oriental sailors hunted sperm whales for their ambergris, thought that these animals simply swallowed this substance with the rest of their food. It was not until 1724 that Dudley showed that ambergris is formed inside the sperm whale, and as late as 1791 the House of Commons in England was so puzzled by this mysterious substance that they summoned Capt. Coffin, the master of a whaler, to explain exactly what ambergris was.

It formerly was believed that ambergris was the result of disease or malnutrition but Robert Clark, who was present when the enormous piece of ambergris was found in the sperm whale caught by the Southern Harvester, reported that the animal was extremely healthy and well fed.

Actually, ambergris may well be comparable to the intestinal stones of otherwise healthy terrestrial mammals. Cows, for instance, often have stones or big hair balls in their intestines, and the well-known Dutch expert on stranded whales, Dr. A. B. van Deinse, examining a stranded porpoise in 1935, discovered no less than 20 glittering white stones in its intestine, the largest of which measured 1 inch x 4/5 inch x 3/5 inch. The stones consisted of calcium phosphate and many organic compounds.

Ambergris may, therefore, be the pathological product of an otherwise normal intestine, its basis being intestinal matter. In fact, a product resembling ambergris has been made experimentally from the feces of a sperm whale. (Australian Fisheries Newsletter, August 1964.)

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ALASKA SHRIMP EXPLORATIONS, 1962-64

By Warren F. Rathjen* and Mitsuo Yesaki**

ABSTRACT

Recognizing the need for more detailed knowledge of potential Alaska shrimp resources, the U. S. Bureau of Commercial Fisheries conducted intensive exploratory fishing with shrimp trawls during the summers of 1962, 1963, and 1964. Waters explored during the 3 years included those of the northern Gulf of Alaska between Cape Suckling (lat. 60° N., long. 144° W.) and Unalaska Island (lat. 54° N., long. 167° W.). Some preliminary explorations were made in portions of the Bering Sea. During the studies, 539 trawl drags (ranging from 30 to 60 minutes each) captured over 100,000 pounds of shrimp. Pink shrimp (Pandalus borealis) made up 72 percent of the total catch, and averaged 90 shrimp per pound. A larger species, side-stripe shrimp (Pandalopsis dispar), made up 18 percent of the catch. Smaller amounts of other species were taken.

The highest average catch rates were made in the general vicinity of the Shumagin Islands where 82 trawl drags of about 30 minutes averaged over 650 pounds per drag.

Observations were made on the occurrence of other species including king, Dungeness, and tanner crabs. During 1963 and 1964, 56 percent of the fish species caught incidentally included various types of flatfish; pollock, rockfish, and other species were important in the remainder.

INTRODUCTION

During recent years, shellfish (including shrimp, crab, lobsters, etc.) have been consumed in increasing quantities in the United States. For example, the total production of U. S.-caught shrimp during 1950 was 191 million pounds. In addition, 40 million pounds of shrimp were imported into the United States for a total supply of 231 million pounds. In 1963, U. S. vessels produced 240 million pounds of shrimp, and an additional 152 million pounds were imported into the United States for a total supply of 392 million pounds (Power 1964). The demand for shrimp has greatly exceeded the domestic supply in recent years. A ready, potential market for shrimp products exists in the United States.

The demand for shrimp products is reflected in the increased landings of Alaska shrimp recently. During the 13-year period 1950-63, the landings increased sevenfold from 2.1 to 15.1 million pounds. Prior to 1958, Alaska shrimp production varied between 1 to 2 million pounds per year. From 1958 to 1963, when the fishery had its greatest growth, shrimp production averaged 12.7 million pounds (Harry 1964). This level of production, however, is probably far below the maximum production because the fishery is now still quite localized.

A primary factor in the greater use of Alaska shrimp has been the development and application of new techniques in processing. Prior to 1957, all Alaska shrimp were peeled by hand and marketed as fresh or frozen shrimp meat. Although hand-peeled shrimp meat continues to be produced, most of the shrimp landed during 1963 were processed by machines. Machine-peeled shrimp meat were marketed canned or frozen in shrimp "logs." Those products, however, did not have the good market demand of hand-picked shrimp products. Further growth of the Alaska shrimp industry would be greatly aided by technological advances in volume storage and in peeling processes to minimize changes in color, flavor, and texture of the product.

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The purpose of this paper is to present a general summary of the relative abundance of pandalid shrimp in the areas of explorations.

PREVIOUS EXPLORATIONS

During 1950-59, Bureau of Commercial Fisheries vessels made 10 exploratory shrimp cruises in Alaska waters. Of the 10 cruises, 4 were made off Southeastern Alaska, 5 off Central Alaska, and 1 off the Alaska Peninsula. The primary aim of the shrimp explorations was to determine the distribution and availability of shrimp in those areas. Large concentrations of shrimp were located in numerous areas around the Kenai Peninsula and Kodiak Island in waters off Central Alaska and around the Shumagin Islands in waters off the Alaska Peninsula. The results of the shrimp exploratory cruises have been incorporated into a summary report by Ronholt (1963). Supplementary information regarding commercial concentrations of shrimp is also available from explorations in Alaska waters by Russian (Ivanov 1962) and Canadian[1/] nationals. Russian explorations delineated concentrations of shrimp around the Shumagin Islands and Kodiak Island. Canadian explorations located large concentrations of shrimp off Kodiak Island.

1962-64 EXPLORATIONS

The investigations were carried out in three stages during the summers of 1962, 1963, and 1964. In 1962, the 6-week period from August 21 to October 4 was spent in exploring the waters off Central Alaska from Nuka Island eastward to Cape St. Elias. During the 9-week period from July 8 to September 11, 1963, the waters off Central Alaska were explored from Montague Island westward to Chrikof Island. During the 1964 cruise, the waters of Central Alaska, Alaska Peninsula, and the Bering Sea were explored from Kodiak Island to Unalaksa Island to Bristol Bay. This cruise extended for a 13-week period from June 16 to September 19. The three cruises were planned to provide more detailed information on the species, size, and abundance of shrimp in the northwestern Gulf of Alaska and Bering Sea. The Bureau of Commercial Fisheries had not previously explored the Bering Sea for shrimp.

Most explorations during the three cruises were made in areas where future development of the fishery appeared logical. Certain phases of the explorations, however, were at locations where no immediate fishery development is anticipated because of a combination of circumstances, particularly the distance from processing centers.

VESSELS

Charter vessels were used. The M/V Yaquina made the 1962 and 1963 cruises; and the M/V Paragon, the 1964 cruise.

The Yaquina (fig. 1) is a typical Pacific Northwest multipurpose purse-seine type vessel with house forward and work deck aft. The registered length is 75.1 feet, and gross tonnage is 109 tons. A 460-hp. diesel engine provides propulsion and drives generators and hydraulic pumps. The vessel is equipped with hydraulic trawl winches and a hydraulic net reel which is used to retrieve and store the trawl net. In most instances the reel was used to haul the shrimp trawl over the stern.

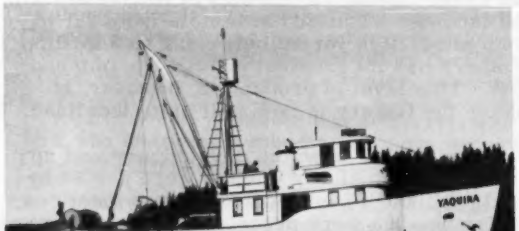

Fig. 1 - M/V Yaquina, chartered by the U.S. Bureau of Commercial Fisheries during summers of 1962 and 1963.

The Paragon (fig. 2) is a Pacific halibut schooner with house aft and well deck amidships. It has a registered length of 80.1 feet and a gross tonnage of 99 tons. Propulsion and trawl winch power are provided by a 390-hp. diesel engine. The trawl winches are mechanically driven. Since the work area on this vessel is amidships, the trawl bag was

1/Cruise Report for the G. B. Reed, Cruise #7, August 20-September 22, 1963. Fisheries Research Board of Canada, Biological Station, Nanaimo, British Columbia, Canada.

taken aboard with boom and tackle after being brought forward on the starboard side to the well deck by means of a lazy-line.

The vessels Yaquina and Paragon were equipped with a full complement of navigational and fishing aids including loran, radar, radiotelephone, automatic pilot, and depth-recorder. The depth-recorders were of the "white-line" type with a range of over 500 fathoms.

Fig. 2 - M/V Paragon, chartered by the U. S. Bureau of Commercial Fisheries during summer 1964.

GEAR

During the cruises, three types of shrimp trawls were used. In 1962, all but two of the trawl drags were made with a semiballoon shrimp trawl measuring 70 feet along the footrope (Greenwood 1959). In 1963, the 40-foot flat shrimp trawl was the primary sampling gear, while in 1964, both the 40-foot flat and the 40-foot semiballoon trawls were used (Fuss 1963). All three types of nets were made of 1½-inch stretched mesh nylon webbing.

The footropes of the trawls were appropriately weighted with chain and/or wire rope so that the nets would fish more effectively on the bottom. The 70-foot semiballoon trawl, which had two warps and 7-foot trawl doors, was towed in the same manner as in otter trawling. The 40-foot trawls were towed by a single warp with 25-fathom bridles and 5-foot trawl doors.

METHODS

The exploratory techniques used were those developed during previous Bureau of Commercial Fisheries shrimp work in the North Pacific (Ronholt 1963) and other regions. Modifications were made to satisfy the needs of the local conditions.

DRAG SAMPLING PROCEDURE: In a few instances, fishing stations were occupied where prior information had indicated that shrimp were concentrated. For the most part, fishing stations were completed in areas not previously sampled with shrimp trawls, or where only limited knowledge of the shrimp resources was available. In those areas, an attempt was made to fish all the bays with suitable trawling grounds. In the offshore areas, fishing was carried on to provide information on the shrimp resources in the gullies and depressions of the Continental Shelf rather than in the shoal areas.

Selection of areas to be fished was determined after U. S. Coast and Geodetic Survey charts of the region were studied. Fishing effort was concentrated primarily on muddy bottom areas between 50- and 100-fathom depths, because previous exploration had found those areas most productive of shrimp. As the vessel traveled over the area selected for sampling, a high-resolution, low-frequency echo-recorder was used to show the nature of the bottom. A drag was usually made if the profile of the bottom was reasonably level and the substrate had a soft consistency. Drags were usually 30 minutes long; timed from the setting of trawl winch brakes to the beginning of hauling the trawl back. Whenever good catches of shrimp were taken, additional drags were made nearby to delineate the extent of the productive ground.

CATCH SAMPLING PROCEDURE: After the trawl warps were hauled in, the trawl doors were secured and the net hauled aboard. The contents of the trawl were emptied onto a sorting table capable of holding 1,000 pounds of shrimp (fig. 3).

An unselected sample of shrimp was taken and separated into component species from which estimates were made of the percentage each species contributed to the total shrimp catch. When the catch was large enough, a sample of each shrimp species was weighed and counted to obtain the number of individual shrimp required to make up 1 pound. Intermittently, samples of pink and side-stripe shrimp were measured and their sex determined.

Fig. 3 - Trawl catch being culled on the sorting table, M/V Yaquina.

The remaining shrimp catch was sorted into wire bushel baskets, and total poundage estimates were made from the number of baskets filled. Poundages of each shrimp species were determined by multiplying the total shrimp catch by the percentage estimates.

Dominant fish species and species groups were also sorted into bushel baskets. Estimates of miscellaneous invertebrate groups and debris were made by eye.

All halibut, plus king, Dungeness, and tanner crabs were sorted from the catch. The total length of each halibut was measured, and the weight estimated. The sex and number of king and Dungeness crabs, and the number of adult tanner crabs were recorded, and their average weights estimated.

ANALYSIS OF DATA

The size of the trawls used for the shrimp explorations varied somewhat from year to year. In these studies, the shrimp catching ability of the 40-foot flat trawl and the 40-foot semiballoon trawl is considered to be identical, and those trawls are taken as the standard unit of gear. Through much of the 1962 explorations, a 70-foot semiballoon trawl was used. We assume that the 40-foot trawl has four-sevenths the spread of the 70-foot trawl. For comparative purposes, therefore, a factor of 0.6 was used to convert the catch of the 70-foot trawl.

The average duration of the drags also varied from year to year. In 1962, the drags were usually 1-hour long; in 1963-64, they were usually 30 minutes. Therefore, the 1962 catch figures have been converted to expected pounds per standard gear per 30 minutes of trawling. The 1963-64 catch figures are actual pounds per standard gear per about 30 minutes of trawling.

A few drags were considered to be ineffective because the absence of bottom organisms suggested that the trawl was not functioning properly. Other drags in which a large portion of the catch was lost due to damage or for other reasons were also considered as ineffective drags.

AREAS

During the 1962-64 shrimp cruises, the perimeter of the Gulf of Alaska from Cape Suckling to Unalaska Island (including parts of Prince William Sound, southern Cook Inlet, and Shelikof Strait) and selected areas of Bering Sea and Bristol Bay were explored (fig. 4). A general description of the Continental Shelf and Slope and the salient oceanographic conditions prevailing throughout that area is given by Alverson, Pruter, and Ronholt (1964).

To facilitate cruise planning and comparative evaluation of catch data, the explored areas were divided into eight geographic entities (fig. 4). These are as follows:

AREA A encompasses the Continental Shelf from Cape Suckling to Nuka Island and Prince William Sound. In that area, much of the Continental Shelf is over 50 fathoms deep. Prince William Sound has few shoal areas less than 50 fathoms, and much of the area has depths over 100 fathoms. For the most part, areas of less than 50 fathoms have sand, gravel, shell, or hard bottoms. In the deeper areas, gray mud predominates. The bottoms are generally favorable for trawling operations throughout area A, which was the most extensively covered, with 37 percent of the total effort.

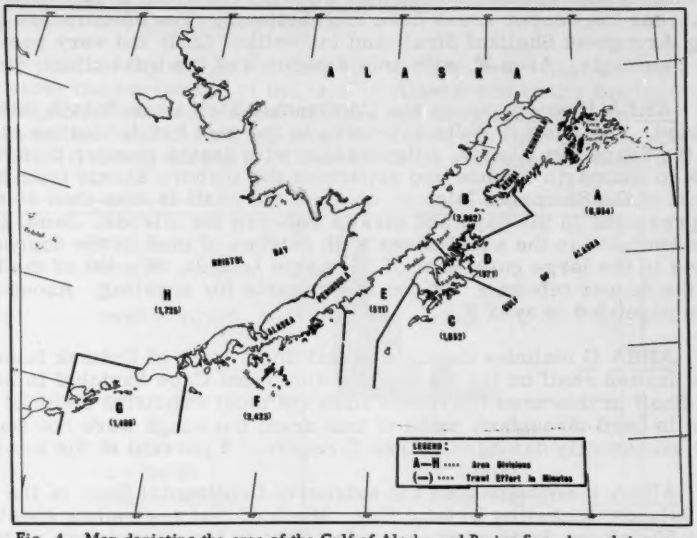

Fig. 4 - Map depicting the area of the Gulf of Alaska and Bering Sea where shrimp explorations were conducted during summers of 1962 through 1964.

AREA B includes the regions adjacent to southern Kenai Peninsula, northern Shelikof Strait, and southern Cook Inlet including Kachemak Bay. Cook Inlet and Kachemak Bay are extensive shoal areas less than 50 fathoms, whereas much of Shelikof Strait is over 100 fathoms deep. Bottom sediments in the shoal areas are predominantly sand, gravel, or shell with mud in the deeper reaches of Shelikof Strait. The bottoms are poor for trawling (fig. 5) between Kenai Peninsula and Afognak Island, but generally favorable for trawling in Cook Inlet, Kachemak Bay, and Shelikof Strait. Area B received 16 percent of the total effort expended.

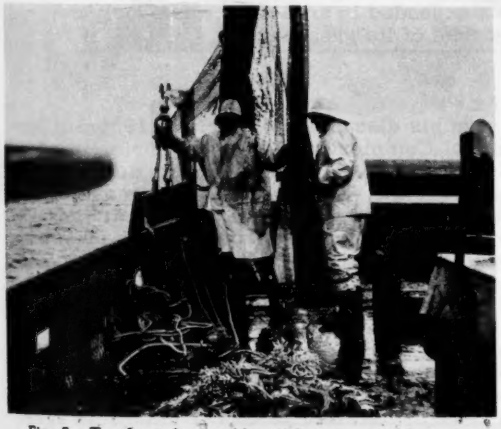

Fig. 5 - Trawl net damaged by towing over coral bottom.

AREA C encompasses the Continental Shelf south of Kodiak Island. Much of the shelf in that area is less than 50 fathoms deep. Sand, gravel, shell, and hard bottoms predominate throughout area C, except for patches of mud bottom in the bays of Kodiak Island and in the gullies of Albatross Bank. Though previous explorations reported poor trawling conditions in that area, our trawls were not damaged. Area C received 9 percent of the total effort.

AREA D includes Marmot and Chiniak Bays and offshore to the 100-fathom depth curve. In that area, Portlock and Chiniak Grounds are extensive shoal areas intersected by depressions and gullies (Marmot Gully, Chiniak Gully). Sand, gravel, shell, and hard bottoms predominate in the shoal areas, with patches of mud occurring in the deeper areas. Nearly all the trawl effort in area D was concentrated in outer Marmot Bay and Marmot and Chiniak Gullies. Less than 5 percent of the total effort was expended in area D.

AREA E includes lower Shelikof Strait and extends westward along the Alaska Peninsula to Sutwik Island. Shoal areas less than 50 fathoms are not extensive in area E except around Semidi Islands. A deep gully over 100 fathoms deep extends inshore between Chirikof and

Semidi Island and up into Shelikof Strait. The shoal areas have sand, shell, and hard bottoms, whereas the deeper areas have mud bottoms. The bottoms are generally favorable for trawling throughout Shelikof Strait and in Shelikof Gully but very poor in the shoals along the Alaska Peninsula. Area E, with only 3 percent of the total effort, received the least coverage.

AREA F encompasses the Continental Shelf from Sutwik Island to Cape Pankof on Unimak Island. The shelf is quite extensive to the east but decreases in width to the westward. East of the Shumagin Islands, a depression with depths greater than 50 fathoms extends from Sutwik to Shumagin Islands and separates the inshore shoals from an extensive shoal offshore. West of the Shumagin Islands, much of the shelf is less than 50 fathoms, but with numerous depressions in the bays and straits between the islands. Sand, gravel, shell, and hard bottom predominate in the shoal areas with patches of mud in the depressions and gullies. The bottoms in the large gully east of Shumagin Islands, in most of the bays along the Peninsula, and in the deeper offshore regions are suitable for trawling. About 13 percent of the total effort was expended in area F.

AREA G includes the Continental Shelf south of Unimak Island to eastern Unalaska Island the limited shelf on the Bering Sea side from Cape Sarichef to Makushin Bay. The Continental Shelf in this area (Davidson Bank) is most extensive south of Unimak Island. The sea bottom is hard throughout much of this area, but snags were not encountered and the trawls were not excessively damaged. Area G received 8 percent of the total effort.

AREA H encompasses the extensive Continental Shelf of the Bering Sea south of the Pribilof Islands, including Bristol Bay. Much of that region has shoal areas less than 50 fathoms. The 50-fathom depth curve extends offshore for a maximum of 300 miles from inner Bristol Bay, and the 100-fathom curve is 100 miles farther out at some locations. In Bristol Bay, the bottom is predominantly mud, changing to sand, gravel, and shell in the offshore Bering Sea, and changing again to mud along the edge of the Continental Shelf and Slope. The bottoms are favorable for trawling throughout the Bering Sea. Although 9 percent of the total effort was expended in area G, it was poorly covered because of its great size.

Fig. 6 - "Clean" catch consisting predominantly of pink shrimp.

RESULTS

In his discussion of earlier (1950-60) Bureau of Commercial Fisheries shrimp explorations in Alaska and elsewhere, Ronholt (1963) discusses the validity of his data in assessing total population sizes. He states that "general conclusions of inter-area abundance must be considered relative and perhaps more indicative of availability than of true abundance." While the same generalities apply to our results, sampling during the 1962-64 explorations was more intensive and in a more restricted area than the earlier work. From an overall analysis, the results for the waters off Central Alaska and Alaska Peninsula agree quite closely with those of the 1954-59 explorations. It is strongly suggested, therefore, that the present findings are reasonably accurate measures of the areal abundance of pandalid shrimp in the northern Gulf of Alaska during the "summer" season.

During the 1962-64 cruises 118,200 pounds of shrimp were caught. The principal species were pink (Pandalus borealis), side-stripe (Pan-

dalopsis dispar), humpy (Pandalus goniurus), coonstripe (P. hypsinotus), and other species (primarily P. montagui, Argis species, and Crangon species).

Pink shrimp accounted for 72 percent (by weight) of the total shrimp catch (fig. 6). This species was caught in all areas along the perimeter of the Gulf of Alaska and in the Bering Sea, but not in Bristol Bay. Throughout that entire area, catches per drag ranged from 0 to 3,000. The pink shrimp was the smallest and varied the most in size of the four shrimp species caught in large quantities. Pinks, taken during the three cruises, averaged 90 count and ranged from 40 to 297 per pound (fig. 7).

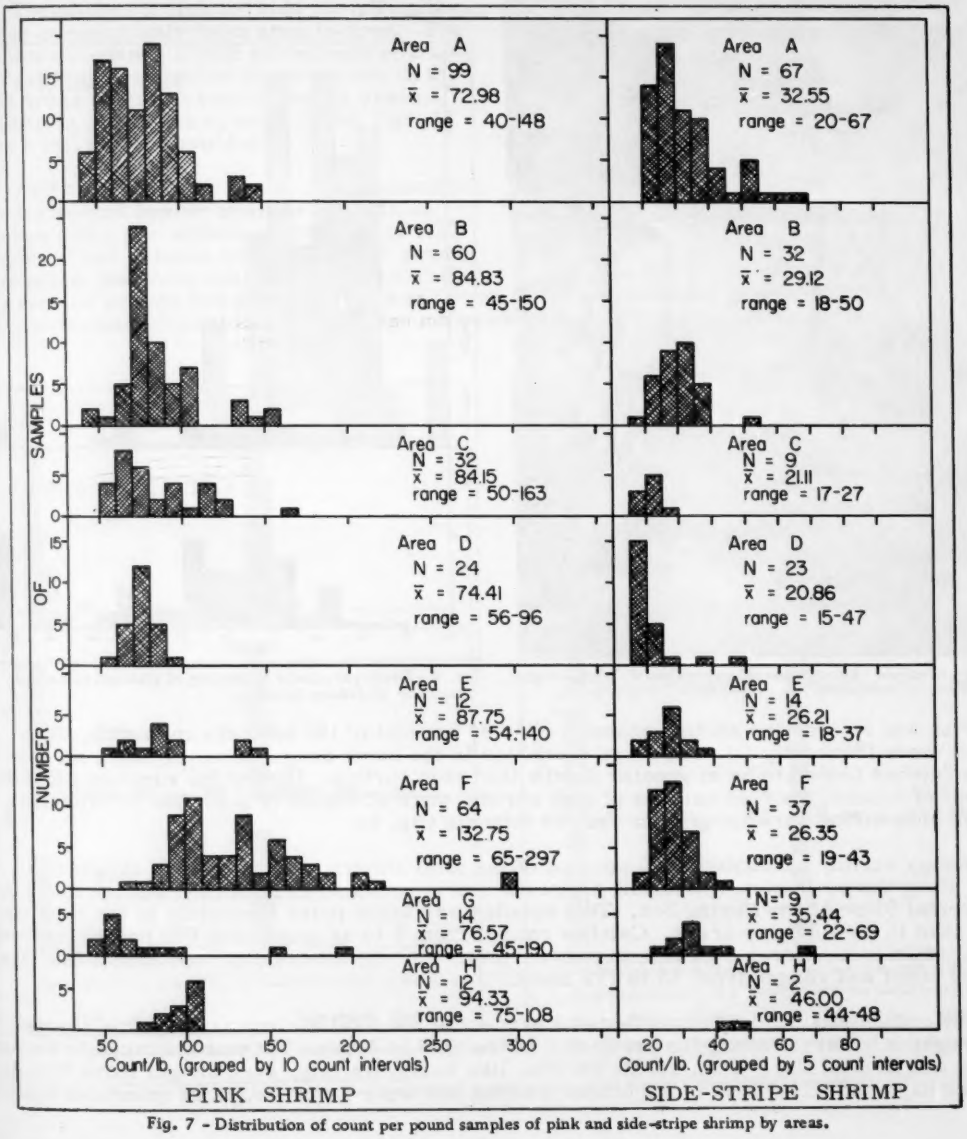

Fig. 7 - Distribution of count per pound samples of pink and side-stripe shrimp by areas.

Side-stripe shrimp was the second most abundant species, representing 18 percent of the total shrimp catch. This species was caught in all areas explored except on the Continental Shelf of the Bering Sea and Bristol Bay. Catches per drag of side-stripe shrimp ranged from 0 to 2,270 pounds.

Although not as abundant as pink shrimp, side-stripe shrimp are of particular interest since they represent a comparatively large pandalid variety which does not now support a sustained commercial fishery in Alaska or elsewhere (fig. 8). Side-stripe shrimp taken during the three cruises averaged 29 count, or three times larger than pink shrimp. Counts per pound of this species ranged from 15 to 67 shrimp (fig. 7).

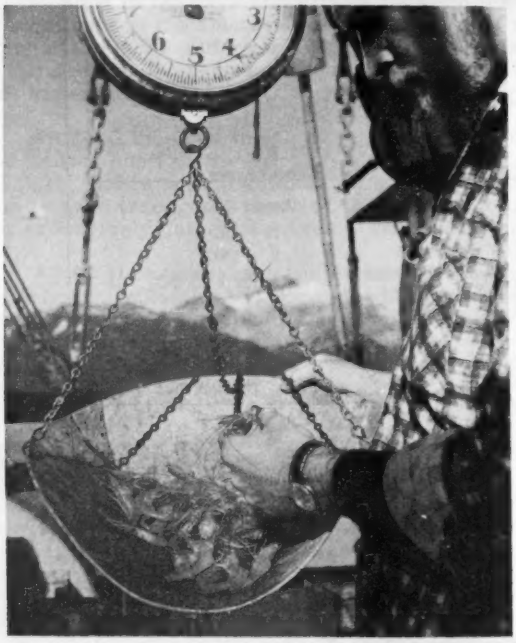

Fig. 8 - A sample of the larger side-stripe shrimp being weighed.

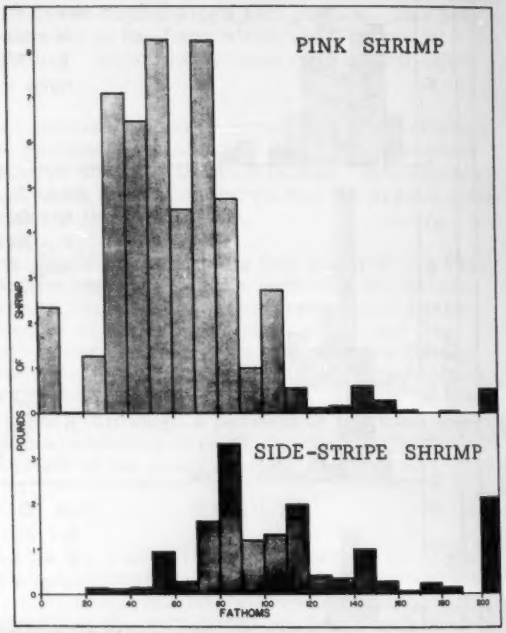

Fig. 9 - Catch per minute of trawling of pink and side-stripe shrimp by 10-fathom intervals.

Pink and side-stripe shrimp accounted for 90 percent of the total shrimp catch. Both species were frequently taken in large quantities in the same drags; however, the best side-stripe catches tended to be at greater depths than pink shrimp. During the summer season in the Gulf of Alaska, the best catches of pink shrimp were at depths of less than 80 fathoms; and for side-stripe shrimp, greater than 80 fathoms (fig. 9).

Humpy shrimp accounted for 6 percent of the total shrimp catch and were caught in all areas along the perimeter of the Gulf of Alaska and in northern Bristol Bay, but not along the Continental Slope of the Bering Sea. This species was taken more frequently in the bays and inlets than in the offshore areas. Catches ranged from 0 to as much as 1,000 pounds per drag. This species is comparable in size to pink shrimp. Throughout the explored areas, they averaged 82 count and ranged from 48 to 172 count.

The coon-stripe shrimp represented 3 percent of the total shrimp catch. This species was caught in all areas along the perimeter of the Gulf of Alaska, but was not taken in the Bering Sea and Bristol Bay. Coon-stripe shrimp, like humpy shrimp, were caught more frequently in the bays and inlets than in the offshore areas and were never caught in quantities equal-

ing the catches of the other three common shrimp. Catch per drag of coon-stripe shrimp ranged from 0 to 320 pounds. Coon-stripe shrimp is a species more comparable in size to side-stripe shrimp, averaging 38 count throughout the Gulf of Alaska. This species ranged from 8 to 99 count, which was much greater than for side-stripe shrimp (fig. 10).

Fig. 10 - The larger pandalid species caught in the Gulf of Alaska; left, coon-stripe shrimp; right, spot shrimp; bottom, side-stripe shrimp.

The catches of pink and side-stripe shrimp varied tremendously from area to area. The relative abundance (catch per minute of trawling) and large catches of these shrimp in the eight areas are discussed below by areas; repetitious reference to table 1 and figs. 11 and 12 will thus be avoided.

AREA A: The catch rate of pink shrimp was the second lowest of all areas with an average catch per minute of trawling of 1.25 pounds. Total catches as much as 750 pounds were made, but most drags made small catches. In only 14 of the 151 drags did the catch of this species exceed 100 pounds. Of those, three drags southeast of Montague Island (Prince William Sound) produced 500- to 750-pound catches during the 1962 cruise.2/

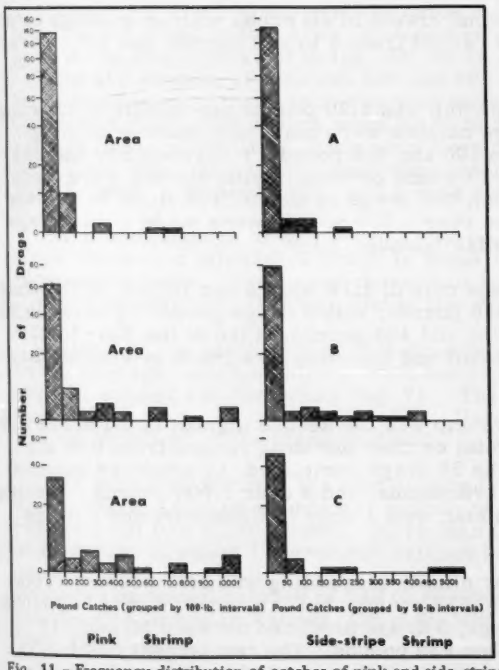

Fig. 11 - Frequency distribution of catches of pink and side-stripe shrimp by areas.

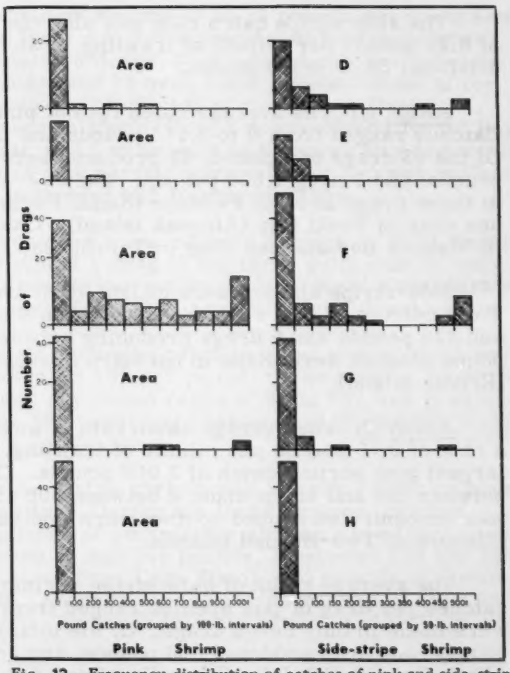

Fig. 12 - Frequency distribution of catches of pink and side-stripe shrimp by areas.

2/ The catch figures for 1962 have been converted to expected pounds per standard gear per 30 minutes of trawling.

Table 1 - Results by Area of the Effort Expended, Total Shrimp Catch, and Catch of Principal Shrimp Species

	Areas							
	A	B	C	D	E	F	G	H
No. drags	151	93	55	33	18	82	48	59
Total min.	6,854	2,862	1,652	971	511	2,423	1,408	1,725
Total lbs.	10,379	20,334	22,671	5,254	884	53,695	4,627	356
Catch/drag	68.73	218.64	412.20	159.21	49.11	654.81	96.40	6.03
Catch/min.	1.51	7.10	13.72	5.41	1.72	22.16	3.99	0.20
Pink shrimp	8,619	14,904	16,039	1,696	325	39,338	3,639	314
Catch/drag	57.07	160.23	291.61	51.39	18.05	479.73	75.81	5.32
Catch/min.	1.25	5.20	9.70	1.74	0.63	16.23	2.58	0.18
Side-stripe shrimp	1,414	3,405	1,681	3,520	543	9,806	854	21
Catch/drag	9.36	36.63	30.56	106.66	30.16	119.58	17.79	0.35
Catch/min	0.20	1.19	1.01	3.62	1.06	4.04	0.61	0.01
Coon-stripe shrimp	34	1,289	926	25	6	1,527	68	-
Catch/drag	0.22	14.15	16.83	0.75	0.33	18.86	1.42	-
Catch/min	0.00	0.45	0.56	0.02	0.01	0.63	0.05	-
Humpy shrimp	60	660	3,710	5	-	2,878	1	-
Catch/drag	0.39	7.09	67.45	0.15	-	35.09	0.02	-
Catch/min.	0.00	0.23	2.24	0.00	-	1.18	-	-
Other	153	71	274	-	8	126	65	21
Catch/drag	1.01	0.76	4.98	-	0.44	1.53	1.35	0.35
Catch/min.	0.02	0.02	0.30	-	0.01	0.05	0.05	0.01

Pink shrimp in area A were not abundant, but were the largest of any area and averaged 73 count per pound. They ranged from 40 to 148 per pound. The 40-per-pound pink shrimp were the largest taken during the three cruises (fig. 7).

The side-stripe catch rate was also the second lowest of all areas with an average catch of 0.20 pounds per minute of trawling. Catches ranged from 0 to 240 pounds, but only 7 drags produced 50 or more pounds.

AREA B: The average catch rate of pink shrimp was 5.20 pounds per minute of trawling. Catches ranged from 0 to 2,175 pounds and large catches were made in a number of drags. Of the 93 drags completed, 22 produced between 100 and 499 pounds, 6 between 500 and 999 pounds, and 3 over 1,000 pounds. The 500- to 999-pound catches of pink shrimp were made in three drags in Nuka Passage (Kenai Peninsula), two drags in northern Shelikof Strait, and one drag in Tonki Bay (Afognak Island). Catches over 1,000 pounds were made in two drags in Viekoda Bay and one drag in Terror Bay (Kodiak Island).

Side-stripe shrimp were caught at an average rate of 1.19 pounds per minute of trawling. Total catches of this shrimp ranged from 0 to 420 pounds, with 8 drags producing between 50 and 249 pounds and 6 drags producing between 250 and 420 pounds. Five of the 250- to 420-pound catches were made in northern Shelikof Strait and the other was made in Viekoda Bay (Kodiak Island).

AREA C: The average catch rate of pink shrimp was the second highest of all areas with a rate of 9.70 pounds per minute of trawling. Total catches per drag ranged from 0 to the largest pink shrimp catch of 3,000 pounds. Of the 55 drags completed, 14 produced catches between 100 and 499 pounds, 4 between 500 and 999 pounds, and 4 over 1,000 pounds. Fishing was concentrated around southeastern Kodiak Island, with 1 drag in Ugak Bay, and 2 drags offshore of Two-Headed Islands.

The average catch of side-stripe shrimp per minute of trawling was 1.01 pounds. Total catches per drag of this species ranged from 0 to 630 pounds, but catches exceeding 50 pounds were made in only seven drags. Of the total drags, 5 drags produced between 50 and 249 pounds, one drag produced 450 pounds, and another 630 pounds. The two largest catches in Alitak Bay (Kodiak Island) greatly affected the average catch rate of side-stripe shrimp in area C.

Catch rates of humpy shrimp and other species were the highest of any area, with rates of 2.24 and 0.30 pounds, respectively, per minute of trawling.

AREA D: The average catch of pink shrimp was 1.74 pounds per minute of trawling. The range of catches varied from 0 to 510 pounds, but most catches were small. Thirty-three drags were completed in that area; only 2 had catches between 100 and 499 pounds, and another had 510 pounds which were taken in outer Marmot Bay.

The side-stripe catch rate of 3.62 pounds per minute of trawling was the second highest of all areas. Catches per drag ranged from 0 to 1,260 pounds with 13 drags producing catches over 50 pounds. Of those, 11 drags caught between 50 and 249 pounds and 2 others had catches of 540 and 1,260 pounds. The two large catches were made in outer Marmot Bay.

Side-stripe shrimp taken in area D were the largest of any area, averaging slightly less than 21 count per pound. The samples had from 15 to 47 shrimp per pound. The 15-count side-stripe shrimp were the largest taken during the three cruises.

AREA E: The pink shrimp catch rate averaged only 0.63 pounds per minute of trawling. Catches per drag ranged from less than 1 to 200 pounds. The 200-pound catch was the only one over 100 pounds.

In that area, as in area D, the catch rate of side-stripe shrimp exceeded that for pink shrimp. Side-stripe shrimp were caught at an average rate of 1.06 pounds per minute of trawling. Catches in the 18 drags completed in the area ranged from 0 to 100 pounds. Six of the drags caught over 50 pounds.

AREA F: The highest average catch rate for pink shrimp of 16.23 pounds per minute of trawling occurred in this area. Catches ranged from 0 to 2,800 pounds, and large catches were made in a number of drags. Of the 82 completed drags, 22 produced catches between 100 and 499 pounds, 18 between 500 and 999 pounds, and 13 over 1,000 pounds. Most of the large catches were made in and around bays along the south side of the Alaska Peninsula. Catches of 500 to 999 pounds were made in 3 drags in Pavlof Bay, 3 drags around Ivanof Bay, 2 drags in Morzhovoi Bay, 2 drags in Unga Strait, and 1 drag each in Stepovak Bay and around Mitrofania Bay. The 1,000-pound-plus catches of pink shrimp were made in 2 drags in Castle Bay, 5 drags in Stepovak Bay, and 1 drag each in Beaver and Morzhovoi Bays.

In more offshore areas, 500- to 999-pound catches were made in 2 drags in West Nagai Strait (Shumagin Islands), 2 drags in Sanak Gully, and 1 drag in the large gully east of the Shumagin Islands. Catches of more than 1,000 pounds were also made in West Nagai Strait (1 drag), Sanak Gully (1 drag), and in the gully east of the Shumagin Islands (1 drag).

Although the catch rate of pink shrimp greatly exceeded rates in other areas, pinks were, on the average, much smaller. Pink shrimp averaged 132 per pound--in no other area did the average exceed 100 per pound (fig. 7). The count per pound range of 65 to 297 was greater than other areas. Four samples of smaller than 200 count were taken of which the 297 count was the smallest of the three cruises.

As with pink shrimp, the best fishing for side-stripe shrimp was in area F with an average catch rate of 4.04 pounds per minute of trawling. During the three cruises, catches ranged from 0 to 2,270 pounds. More than 50 pounds of side-stripe shrimp were taken in each of 24 drags, of which 14 produced catches between 50 and 249 pounds, 3 between 250 and 499 pounds, and 7 over 500 pounds. Drags in Morzhovoi Bay, Unga Strait, and outside of Stepovak Bay each produced catches of 250 to 499 pounds. Catches of side-stripe shrimp of over 500 pounds were made in Kuiukta, Chignik, Mitrofania, Stepovak (2 drags) Bays, and in Unga and West Nagai Straits.

Humpy shrimp were caught at an average rate of 1.18 pounds per minute of trawling in this area. The largest single catch of 1,000 pounds was made in Belkofski Bay (Alaska Peninsula).

The highest average catch rate for coon-stripe shrimp was in area F, where 0.63 pounds were taken per minute of trawling. The largest catch of 320 pounds was made in Beaver Bay (Alaska Peninsula).

AREA G: The average catch rate of pink shrimp was 2.58 pounds per minute of trawling. Catches ranged from 0 to as much as 1,200 pounds, but only four drags produced catches over 100 pounds: one drag each in Unimak Pass and Beaver Inlet (Unalaska Island) yielded catches between 500 and 999 pounds and one drag each off Cape Pankof (Unimak Island) and in Unalaska Bay (Unalaska Island) took over 1,000 pounds. The four drags greatly increased the average catch rate for area G.

The side-stripe catch rate averaged 0.61 pounds per minute of trawling. Catches in the 48 completed drags ranged from 0 to 430 pounds. Most of the catches were small, however, with only 4 drags taking between 50 and 249 pounds and 1 drag catching 430 pounds. This largest catch was made in Beaver Inlet (Unalaska Island).

AREA H: The pink and side-stripe shrimp catch rates were the lowest of all areas with an average catch per minute of trawling of 0.18 and 0.01 pounds, respectively. The two species were not found in large concentrations in the Bering Sea or Bristol Bay. Catches per drag of pink shrimp ranged from 0 to 49 pounds. Catches of side-stripe shrimp ranged from 0 to 15 pounds.

INCIDENTAL INVERTEBRATE AND FISH CATCHES

Shrimp trawls probably are not effective sampling gear for most organisms other than shrimp because of the limited area covered and the slow speed at which the trawls are towed. Incidental catches of other species in a series of standardized tows, however, will provide indications of relative abundance.

Table 2 - Number of Individuals of Indicated Species Caught during 1963 and 1964

Year	King Crab		Dungeness	Tanner	Halibut
	Male	Female			
1963 . . .	366	317	169	1/ 800	143
1964 . . .	454	478	18	562	532
Total .	820	795	187	1,362	675

1/Estimated figure derived by dividing pounds of tanner crab caught by 3.

The incidental catches of crabs caught during the summer cruises of 1963 and 1964 are summarized in table 2. Of the three commercial crab species, king crab (Paralithodes camtschatica) was the most commonly encountered. More individuals of both males and females were caught in the area from Kodiak Island to Bristol Bay (1964 cruise) than from Prince William Sound to Kodiak Island (1963 cruise). The second most commonly caught species was adult tanner[3/] crab (Chionoectes species). Although tanner crabs are not now intensively utilized by American nationals, this species may become commercially important. Russians and Japanese have been catching this species. Only occasional Dungeness crabs were taken throughout the explorations; they were especially scarce during the 1964 cruise.

Pacific halibut (Hippoglossus stenolepis) were not taken in great numbers during either 1963 or 1964 (table 2); however, a single catch of 252 immature individuals was made in inner

Table 3 - Pounds of Indicated Fish Species Caught during 1963 and 1964

Year	Catch of Flatfish			Catch of Other Fish				
	Turbot	Flathead	Other 1/ Flatfish	Pollock	Rockfish 2/	Foodfish	Sculpins	Incidental Species 3/
1963	3,218	1,403	654	4,145	550	730	807	385
1964	12,178	4,962	3,752	4,642	2,426	2,189	3,280	1,076
Total	15,396	6,365	4,406	8,787	2,976	2,919	4,087	1,461

1/Includes primarily yellowfin, rock, rex, dover, English, lemon soles.
2/Primarily Pacific ocean perch, also rough-eye, northern, sharpchin, dusky rockfishes.
3/Includes true cod, black cod, herring, smelt.

3/Only marketable-size tanner crabs were counted.

Bristol Bay, a known nursery area for halibut. Even when this catch is disregarded, halibut were taken more commonly during the 1964 cruise than in the previous year.

The incidental catches of common fish species and species groups are summarized in table 3. The 2-year total of incidental catches of fish consisted of 56 percent flatfish and 44 percent other fish.

Arrowtooth flounder (Atheresthes stomias) was the most commonly caught species and accounted for 33 percent of the total fish catch. Catches of that species ranged from 0 to 500 pounds per drag. The next most abundant species was walleye pollock (Theragra chalcogrammus), which constituted 19 percent of the total fish catch. Walleye pollock catches ranged from 0 to 500 pounds per drag. Flathead sole (Hippoglossoides elassodon) was the third most abundant species, constituting 14 percent of the total fish catch, and 0 to 450 pounds per drag were taken.

The remainder of the incidental fish catches is lumped in species groups. Included are other flatfish which contributed 9.5 percent; sculpins, 9 percent; rockfish, 6.5 percent; other food fish, 6 percent; and other fish, 3 percent of the total catch of incidental fish.

RESOURCE POTENTIAL

Explorations by the Bureau of Commercial Fisheries have shown shrimp to be locally abundant in several areas of Alaska, and indications are that the resource could support a sizable fishery. The abundance and commercial potential of the resource are even more dramatically demonstrated by the shrimp landings of commercial vessels in the newly developed fishery. Two commercial vessels operating off southern Kodiak Island averaged over 3,000 pounds of shrimp per hour of trawling after commercial shrimp operations began there (table 4).

Table 4 - Catch Per Hour for Two Vessels Fishing off Kodiak Island

	No. of Drags	Average Length of Drags	Total Catch of Shrimp	Per Hr.
		Minutes	. . . .(Lbs.). . . .	
Vessel A (1963)	94	112	557,500	3,168
Vessel B (1961)	271	79	1,412,000	3,933

The ocean pink shrimp (Pandalus jordani), a species comparable in size to Alaska pink shrimp, has a fishery off the coasts of Washington and Oregon. Magill and Erho (1963) provide data on catch per unit effort of vessels fishing shrimp in that area. Vessels fishing out of Washington averaged catch rates of 730 pounds per hour during 1957, and Oregon vessels averaged 495 pounds per hour in 1958. The figures for 1957 and 1958 are catch rates for the first years that shrimp were landed in any great amounts in Washington and Oregon. They are much less than the catch rates over 3,000 pounds per hour trawling of the two commercial vessels operating off Kodiak Island. The catch rate statistics for the Kodiak area indicate there is a much greater shrimp potential there than off the Washington and Oregon coasts. Furthermore, exploratory fishing cruises have demonstrated that catch rates of other areas exceed those off southern Kodiak Island. Also, although the bulk of the shrimp resource in Alaska is small shrimp, there are significant quantities of shrimp of a size comparable to the small "40-count" shrimp marketed from the Gulf of Mexico fishery. Considering these factors, the as-yet-undeveloped shrimp resources of Alaska waters have an impressive potential.

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Note: Cruise reports and detailed fishing logs of the three shrimp exploratory cruises summarized in this report are available and may be obtained by writing to the U. S. Bureau of Commercial Fisheries Exploratory Fishing and Gear Research Base, Box 2481, Juneau, Alaska 99801.

HADDOCK NEVER HAD IT SO GOOD

The bright, new way to prepare haddock is Haddock Delmonico, created for you by the United States Department of the Interior's Bureau of Commercial Fisheries. In this kitchen-tested recipe, named after the famous New York restaurant; the rich, meaty haddock is combined with lemon juice, grated onion, and hot pepper sauce, then baked just long enough to bring out the full, delicious flavor. The haddock is served with whole cranberry sauce; a colorful, complementary combination that really "goes together."

Haddock fillets are available fresh or frozen throughout the country. They are an easy-to-do, easy-on-the budget specialty, ready to bring the "tang of the sea" flavor to your dinner table.

HADDOCK DELMONICO

2 pounds haddock fillets or other fish fillets, fresh or frozen
¼ cup butter or margarine, melted
2 tablespoons lemon juice
1 teaspoon grated onion
½ teaspoon salt
⅛ teaspoon liquid hot pepper sauce
Dash pepper
Chopped parsley
1 can (1 pound) whole cranberry sauce

Thaw frozen fillets. Skin fillets. Cut into serving-size portions and place in a well greased baking dish, 12 x 7½ x 2 inches. Combine butter, lemon juice, onion, and seasonings; pour over fish. Bake in a moderate oven, 350° F., for 25 to 30 minutes or until fish flakes easily when tested with a fork. Sprinkle with parsley and serve with cranberry sauce. Serves 6.

GEAR AND TECHNIQUE OF THE SEA BASS TRAP FISHERY IN THE CAROLINAS

By J. B. Rivers*

ABSTRACT

An increasing number of shrimpers along the Carolina Coasts have diversified fishing activities by producing black sea bass (Centropristes striatus) in commercial quantities. Utilizing baited wire traps similar to those used in the Chesapeake Bay crab fishery, two-man boats have made landings ranging up to 6,300 pounds of salable fish. As a daytime fishery, 15 to 20 units of gear, each consisting of a trap, polyethylene line and bamboo flag buoy, are fished along the 10 fathoms curve. The catch, sold in the round, is handled by local dealers or trucked to northern markets and is completely dependent upon market supply and demand.

BACKGROUND

The end of the regular shrimp season along the North and South Carolina coasts of the United States marks the beginning of a long, unproductive lay-up for the small 35- to 50-foot shrimp vessels (Sundstrom 1957) and their crews. The larger vessels, if capable, generally move southward to the more productive grounds either off the coast of Florida in the Cape Kennedy and Key West areas, or into the Gulf of Mexico because those shrimp grounds have more to offer the shrimp fishermen than the coast of the Carolinas during the winter months.

In 1960, small vessels (35-45 feet) from various ports in the Carolinas began catching sea bass (Centropristis striatus) with wire-mesh crab traps. Landings have steadily increased since the beginning of the fishery so that the total production is now close to 2 million pounds (table).

Black Sea Bass Trap Fishery Landings in North and South Carolina

Year	North Carolina	South Carolina
1964	240,100	224,700
1963	197,563	264,000
1962	304,033	261,000
1961	327,255	29,000
1960	81,300	13,000
Total	1,150,251	791,700

SEASON

The traps are set in depths of about 10 fathoms along the North and South Carolina coasts from the end of the shrimp season in early winter to the start of the new shrimp season in the spring.

Winter weather conditions along that section of the coast constitute a major problem in the fishery by limiting the number of fishing days. A combination of rough seas and small vessels does not provide safe and comfortable conditions, nor does it encourage the recruitment of new personnel or vessels into this new fishery.

VESSELS USED

The vessels now used in the fishery range in size and description from the regular shrimp vessels (fig. 1) and fancy 20-foot sport fishing boats, to a 110-foot World War II converted rescue vessel that operates as a charter fishing boat during the tourist season.

All the shrimp vessels are equipped with a standard trawling winch, which they use for mechanically hauling the traps. The winch heads are somewhat inefficient. Modifications to increase their hauling speeds would increase the efficiency of the operation by reducing the hauling time of each unit.

Some of the vessels such as those previously engaged in sport and party fishing have improvised hauling gear powered by small air-cooled gasoline engines. A small radial davit at the railing (fig. 2) with an open block facilitates quick and easy handling of the trap warp.

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U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
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Fig. 1 - A South Carolina vessel, with fish traps and gear stacked on the stern, preparing to depart for the fishing grounds.

Fig. 2 - Hauling traps with a small davit and open block.

None of the vessels is equipped with radar, loran, or any of the newer electronic fish-finding devices that incorporate the use of the "white line" or the cathode ray tube means of presentation. Most of the vessels use echo-sounders with flashing-light bottom indicators. Some are equipped with recorders that give a graphic presentation of the contour of the ocean floor (fig. 3). Those recorders are more sensitive and register the slightest rise or indentation, which usually indicates the most suitable bottom for catching fish.

Fig. 3 - Depth-recorder tracings are intently observed as the vessel proceeds over or near the prospective areas to conduct the fishery.

GEAR

The principal gear used in this fishery is the Chesapeake Bay crab trap, similar to that described by Isaacson (1957). It can be purchased either completely assembled (current price $4) or in sections ($1.80) to be assembled by the fishermen. Associated gear (fig. 4) includes a $\frac{1}{4}$-inch diameter, 3 strand polyethylene line attached directly to the bottom of the trap and to the marker buoy. The warp-scope ratio is 1.5 to 1 (i.e., 15 fathoms of warp in 10 fathoms of water). The mark-

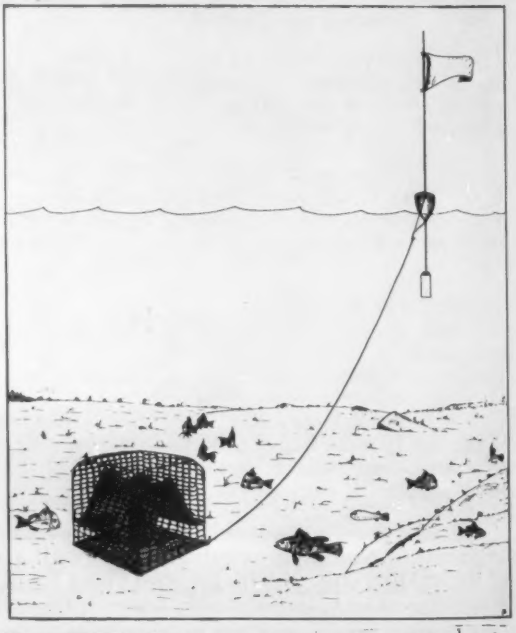

Fig. 4 - Diagram of trap and associated gear which includes $\frac{1}{4}$-inch diameter, 3-strand polyethylene line attached to a marker buoy.

er buoy consists of a bamboo pole, 12 to 14 feet long, with flotation provided by a standard conical crab pot buoy with a hole drilled through the middle. The underwater end is embedded in a 1-quart plastic milk container filled with cement. This acts as a counterbalance and maintains the pole in an upright position for easier sighting and identification. Colored cloths that will not blend in with the sea and sky are used for flags. Some of the fishermen paint numbers on the flags to help them remember the sequence of their setting pattern. The shoal depths of the area fished, combined with only moderate currents, allow the traps to remain stationary on the bottom without anchors.

FISHING OPERATION

Since this is a daytime fishery, boats leave the dock in time to arrive on the grounds at sunrise for the fishing operation. The fishing area is generally selected from the results of the previous day's catches or from the captain's experience and knowledge of the fishery.

During the run to the grounds, trap-baiting is completed; the baits are usually menhaden, herring, spot, croaker, or mullet. The most preferable choices are menhaden and herring. Their oily meat appears to excrete a slick that attracts sea bass into the chamber of the trap.

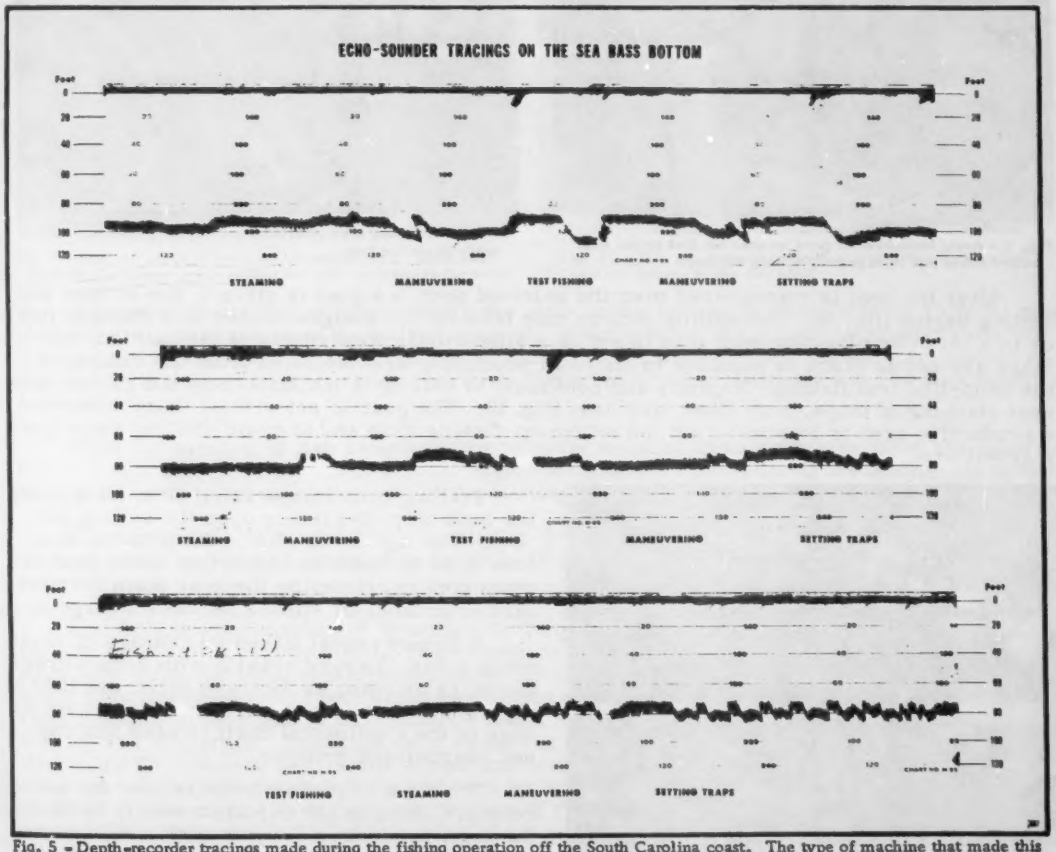

Fig. 5 - Depth-recorder tracings made during the fishing operation off the South Carolina coast. The type of machine that made this tracing does not show indications of fish over the sea bed, but only the contour of the bottom.

Reportedly, some fishermen have placed cans of catfood in their traps. The cans are punctured with holes to permit the escapement of the contents, which attracts the fish towards, and eventually into, the trap. The availability of fresh bait is dependent upon the sources of supply in the various local areas, but frozen bait is readily available to the fishermen. The current price for frozen bait in the South Carolina area is $6.18 a hundredweight.

Careful attention is paid to the depth-recorder (fig. 5) for indications of significant changes in the topography of the sea floor. Whenever changes are registered, a test is made of the area using rod and reel, or hand lines with baited hooks (fig. 6).

Fig. 6 - Areas indicative of good catches are first tested with baited hooks and lines prior to setting the traps.

Fig. 7 - Awaiting the signal from the captain, the striker stands ready to set the trap.

After the boat is maneuvered over the selected spot, a signal is given to the striker and setting begins (fig. 7). The setting pattern may take varied designs, either in a straight line or in a circular plan, but each trap is set as a single unit. Regardless of the pattern, the traps are set as close as possible to the most promising area selected from the results of the hand-line test fishing. Rapidity and continuity of setting is maintained by the careful and neat stacking of traps, buoy lines, and buoy (fig. 8). The gear is set without delay whenever a productive area is located to get the maximum fishing time and to avoid drifting away from a select area.

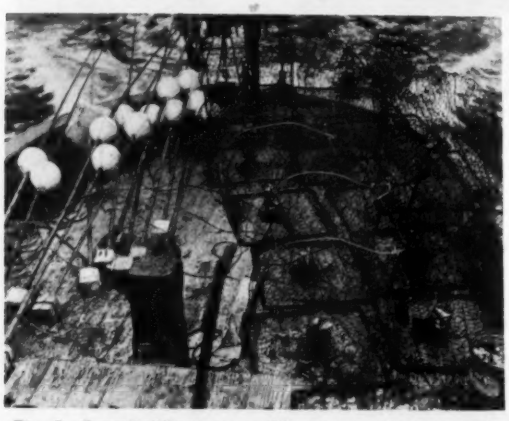

Fig. 8 - Buoys and lines are carefully stacked with lines neatly coiled to prevent fouling.

Fishing time ranges from 20 to 45 minutes for each trap, depending upon the setting pattern. The tighter or closer the pattern, then less time is spent maneuvering; more time is consumed in retrieving the gear when the pattern is broader or spread out over a large area.

A 2-man vessel fishes an average of 15-20 traps a day. Larger vessels with 5-man crews can work as many as 40 traps daily, and then at night may move into the deeper water along the edge of the Continental Shelf to hand line for red snapper and grouper.

The most important requirement for successful fishing is the captain's ability to locate the most productive grounds with a minimum loss of time. Grounds must be tested and gear must be set and retrieved in the shortest period possible to maintain a high catch rate per unit of fishing gear.

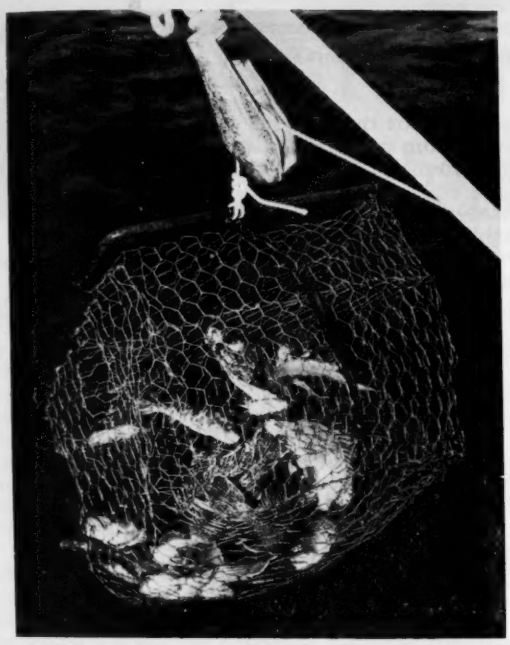

Fig. 9 - A small catch of sea bass coming aboard. Incidental catches of scup (porgy) or puffers are also included in the traps.

Fig. 10 - Fish are dumped on deck or into a box to be culled prior to storage in the fish hold.

The optimum amount of time to keep the gear on the bottom is thought to be 15 to 20 minutes per trap, because once the bait is gone the effectiveness of the trap is greatly reduced. It appears that sea bass in this area are attracted to the trap for food rather than shelter as opposed to the situation in certain other trap fisheries where unbaited traps are successfully utilized.

When the number of fish caught is temporarily reduced in an area, searches are made to locate a new and more productive area. Again a captain's knowledge of the bottom topography of an area adds to the effectiveness of the fishing operation.

After each trap is hauled (fig. 9), the fish are dumped into a box (fig. 10), and the gear is stacked ready to be used again when needed. If the gear is to be reset the traps must be rebaited.

The fishing gear method of operation is quite dissimilar to those of the older sea bass fishery off the New Jersey coast. The season in that area extends from May to December with June being the most productive month. The Jersey fishermen use the Jersey skiff, a small (26-30') seaworthy boat, which has ample cockpit space for the handling of the gear. A single-man boat sets and tends about 500 traps whereas a two-man boat maintains and operates up to 1,600 traps. Landings have ranged up to 5,000 and 6,000 pounds of black sea bass. Where the Carolinians search for lumps and test fish with hand lines, the northern fishermen seek out wrecks and rough bottom and rely on their electronic devices for the indication and location of commercially significant catches of fish. Another major difference is that the Jersey fishermen use unbaited wooden slat traps (Dumont and Sundstrom 1961), which are set out in strings of 10 or 20 traps per line instead of singly. This technique is similar to the one employed by some of the New England lobstermen. Attempts to increase the trap's productivity has led to some experimentation by the Jersey fishermen. These include using either a mirror or a battery-powered light to attract the fish and lure them into the trap.

SALE OF CATCH

Daily catches have ranged up to 6,300 pounds of sea bass, but the financial success of a trip depends entirely upon the market prices.

At sea the fish are stored in the same type wooden box that is used to pack shrimp for shipment. A layer of crushed ice is spread on the bottom of the box; then the fish, and finally another layer of crushed ice is spread over the fish to maintain the quality of the product.

Fish are sold in the round (not headed or gutted). They are handled locally or shipped to the northern markets. No set price has been established, nor does the price stabilize itself during the season. The fishermen are fully dependent upon the customers' demand and the supply in the market, so the prices during a season have ranged from 4 to 40 cents a pound.

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Note: Appreciation is gratefully extended to Capt. Wright Skinner, Jr. of Georgetown, S. C., for allowing me the opportunity to observe and photograph the fish trap operation on board his vessel Lillian Skinner.

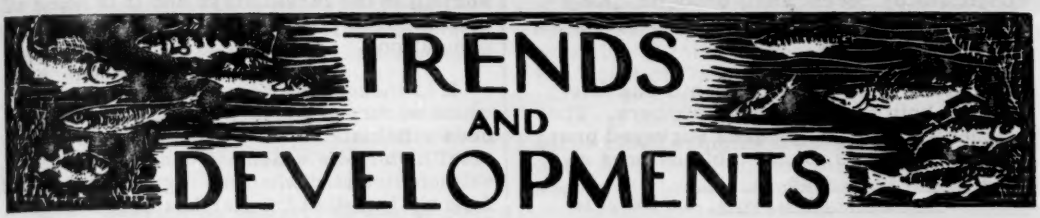
NOVEMBER 1958 SUPPLEMENT OF COMMERCIAL FISHERIES REVIEW STILL AVAILABLE

Copies of the November 1958 Supplement of the monthly periodical Commercial Fisheries Review are still available. This supplement contains articles on the nonsaponifiable fraction of menhaden oil; experimental studies to extend uses of menhaden oil in the leather industry; physical and chemical characteristics of herring, menhaden, salmon, and tuna oils; chemical and nutritional studies of fish oils; fish-oil research at the Seattle Fishery Technological Laboratory of the U.S. Bureau of Commercial Fisheries; utilization of fish-oil derivatives in ore flotation; oxidative deterioration of fish and fishery products; oxidative enzymes in fish tissue.

Requests will be filled on a first-come first-served basis until supply is exhausted. Write to: Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 N. Fort Myer Dr., Rm. 510, Arlington, Va. 22209.

Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.



Alaska

KING CRAB WORKSHOP SCHEDULED:

A king crab workshop was sponsored by the Department of the Interior's Bureau of Commercial Fisheries technological laboratory at Ketchikan in Anchorage, Alaska, on February 28, 1966. This was the third Industry-Government meeting held to discuss technological problems of king-crab processing. Purposes of the meeting were to (1) discuss problems and needs of the industry, and (2) discuss a preliminary draft of the USDI Quality Standard for frozen king crab blocks. Immediately following the workshop the Alaska King Crab Quality Control and Marketing Board met to discuss its program for 1966. The Board's approved program for 1966 includes a $50,000 advertising campaign. At this meeting discussion of the Board's quality control responsibilities was planned.

* * * * *

U. S. BERING SEA KING CRAB CATCH INCREASES:

Based on catch statistics from the Alaska Department of Fish and Game, a tabulation of the U. S. harvest of king crabs in the Bering Sea was prepared by the Department of the Interior's Bureau of Commercial Fisheries biological laboratory at Auke Bay for the International Pacific Fisheries Commission's annual report. Although modest, catches have increased steadily to a high of over 223,000 crabs in 1965. The table shows that fluctuations in average weight of crabs have occurred.

Annual U. S. Commercial Harvests of King Crab in Eastern Bering Sea[1/]

Year	Crab	Average Weight
	No.	Lbs.
1965	223,248	7.3
1964	122,848	8.3
1963	100,728	7.7
1962	10,346	10.0
1961	61,528	10.0
1960	87,730	7.8

1/Includes catches in territorial waters (within 3 miles of shore) because these crab are undoubtedly part of the eastern Bering Sea stock.

California

ABALONE OBSERVATIONS AND GROWTH STUDIES CONTINUED:

M/V "Mollusk" Cruise 65-M-3-Abalone (December 6-18, 1965): To determine the red abalone (Haliotis rufescens) population by random sampling methods for comparison with commercial harvest data, and to determine the distribution of various sizes of abalones was the purpose of this cruise by the California Department of Fish and Game research vessel Mollusk. The vessel operated in the coastal area from Point Estero to Cambria.

Thirty randomly-selected diving stations were visited. Station depths ranged from 20-66 feet. At each station a 290° transit line, 100-feet long and 15-feet wide, was covered by two divers. All removable abalones encountered were measured; if they could not be removed, size was estimated.

Big swells and tides caused turbidity which greatly restricted visibility in shallow water. At some stations, several dives were made before counts could be completed. In all, 337 abalones were observed: 79 legals (more than $7\frac{3}{4}$ inches); 209, 4-$7\frac{3}{4}$ inches; and 49, smaller than 4 inches. No abalones were seen during five dives because they were at stations with sandy or barren rock bottom in water over 60 feet deep.

Actively feeding abalones were noted at several locations. As much as 50 millimeters (1.96 inches) new shell growth was recorded on some individuals. Other shellfish, including H. kamtschatkana, H. walallensis, H. assimilis, Calliostoma, Tegula and several limpet species, also showed evidence of good growing

conditions by recent shell deposits. Kelp growth was good, but some winter sloughing was occurring.

Abalone distribution by depth was fairly uniform both by size and by numbers. The northern portion of the area surveyed produced the greatest number of abalones and the most of legal size.

Note: See Commercial Fisheries Review, Feb. 1966 p. 14.

* * * * *

NOTES ON MARINE RESOURCES FOR 1965:

Population surveys during the year disclosed about 500 sea otters between Carmel Bay and Point Conception; 3,563 elephant seals, which is the highest count on record; 22,167 sea lions, and 1,063 harbor seals. Although all these resources are in good condition, protection of the sea otter will continue to receive priority attention.

Sea Lion

Preseason surveys indicate crab fishing will be good in the Eureka area but poor in the San Francisco area. Shrimp are plentiful in the Crescent City-Eureka area, promising a good year there in 1966.

During the year, 2 bluefin tuna tagged in California in 1962 were caught near Japan, bringing to 5 the number of trans-Pacific migrants tagged off California and caught off Japan. This demonstrates conclusively that fishermen on both sides of the Pacific harvest the same stock.

Shrimp were reared through 11 larval stages at the Redwood City temporary laboratory, the first time this species has been reared from the egg to the postlarval state. This study may enable identification of shrimp in the larval stage and it is hoped will lead to more efficient techniques for sampling populations.

It is thought the heavy king salmon losses which occurred annually on Butte Creek have been eliminated. Those losses resulted from brief high flows which left many thousands of salmon stranded when the high flows subsided. A newly installed barrier has kept salmon from the upper reaches of Butte Creek and eliminated the losses. (California Department of Fish and Game, January 15, 1966.)

* * * * *

MARINE SPORT FISH SURVEY OFF SOUTHERN CALIFORNIA:

Airplane Survey Flight 65-M-3 (December 6 and December 28, 1965): Two one-day surveys were made to count poles and fishermen along the coastline. For this purpose, the southern California coastline from the Mexican Border to Jalama Beach State Park was surveyed from the air by the aircraft Cessna "182" N9042T of the California Department of Fish and Game. The counts provide data for an independent estimate of total effort and the calculation of a conversion factor to be used for estimates of effort in those areas not covered by the ground crews.

Note: See Commercial Fisheries Review, February 1966 p. 15.

Central Pacific Fisheries Investigations

TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 85 (July 23-September 7, 1965): Collection of whole blood samples from all skipjack tuna caught for subpopulation evaluation was the main objective of this cruise by the research vessel Charles H. Gilbert, operated by the Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. The area covered was the west coast of Baja California, the Gulf of California, and the Revillagigedo Islands.

Other objectives of the cruise were to collect and freeze whole blood samples for use in immunizations; obtain length and sex data from tuna sampled for blood; collect and preserve any unusual specimens and take color photographs when practical; and collect samples for electrophoretic analysis.

A total of 406 skipjack tuna and 178 yellowfin were caught during the cruise and sampled, 3 large turtles were caught and measured, and 76 bird flocks were observed.

Blood samples were obtained as planned, biological data was gathered, and the usual watch for fish, birds, and aquatic mammals maintained.

M/V "Charles H. Gilbert" Cruise 86 (October 19-26, 1965): The collection of live mackerel-like (scombrids) species for behavior studies was one of the main objectives of this cruise. The area covered was south of Oahu between Mokumanu and Brown Camp and not more than 20 miles from shore.

Other objectives of the cruise were to collect tuna specimens for density determinations; determine weight lost from small skipjack after removal of the head, viscera, and red muscle; and collect skipjack brains and eye lenses. A total of 161 skipjack and 9 little tunny were returned live to Kewalo Basin.

A standard watch for fish, birds, and aquatic mammals was maintained. Oxygen concentration of water in the transfer tanks were sampled. Troll lines were out continuously between Kewalo Basin and each fishing station. Two mahimahi (Coryphaena hippurus) were caught.

M/V "Charles H. Gilbert" Cruise 87 (November 9-16, 1965): Obtaining fresh samples of surface-caught yellowfin tuna for density determinations and photographs was the main objective of this cruise. The waters within 100 miles of Oahu and Kauai were covered.

Other objectives were to collect and preserve blood samples from skipjack tuna and other scombrids and to collect and return live scombrids to behavior tanks at Kewalo Basin.

In all, 22 yellowfin tuna and 57 wavyback skipjack tuna were returned alive to the Bureau's facility at Kewalo. A total of 25 wahoo were also caught.

A standard weather watch was maintained except during fishing operations; recording thermograph was maintained while at sea; and other oceanographic observations were made.

Note: See Commercial Fisheries Review, Oct. 1965 p. 26.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-DECEMBER 1965:

Fresh and Frozen: Purchases of fresh and frozen fishery products in December 1965 for the use of the Armed Forces were down considerably in quantity and value from the previous month. Average prices for most fishery products were slightly higher.

Table 1 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Personnel Support Center, December 1965 with Comparisons

Products	December				January-December	
	1965		1964		1965	1964
	Quantity	Avg. Cost	Quantity	Avg. Cost	Quantity	
	Pounds	Cents/Pound	Pounds	Cents/Pound	(Pounds)	
Shrimp:						
raw headless	30,350	100	33,650	98	1,150,650	1,234,200
peeled and deveined	103,200	135	104,980	134	1,953,510	1,664,304
breaded	285,300	87	385,000	87	4,973,274	4,245,770
molded and breaded	42,092	68	49,000	64	707,160	496,620
Total shrimp	460,942	97	572,630	94	8,784,594	7,640,894
Scallops	54,250	60	189,936	77	1,933,674	2,777,486
Oysters:						
Eastern	125,932	130	72,926	108	744,621	843,807
Pacific	10,100	88	22,836	77	272,814	341,914
Total oysters	136,032	127	95,762	101	1,017,435	1,185,721
Fillets:						
Cod	20,900	48	20,300	32	504,690	496,916
Flounder	101,500	37	204,000	31	2,909,600	3,062,452
Ocean perch	99,000	36	203,000	30	3,619,060	3,522,970
Haddock	53,550	38	131,752	37	1,544,455	1,898,066
Haddock portions	140,800	51	202,750	46	1,855,834	774,072
Steaks:						
Halibut	75,000	61	71,867	49	1,373,760	1,278,144
Salmon	7,240	67	11,270	68	168,640	260,825
Swordfish	200	75	2,090	70	5,030	17,261

Compared with the same month in the previous year, purchases in December 1965 were down 25.7 percent in quantity and 7.6 percent in value. The decline was due mainly to lower purchases of shrimp, scallops, fish fillets, haddock portions, and salmon and swordfish steaks.

Total purchases of fresh and frozen fishery products for 1965 were up 5.2 percent in quantity and 24.2 percent in value as compared with the previous year. Larger purchases of shrimp and haddock portions were greatly responsible for the increase in 1965.

Table 2 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, December 1965 with Comparisons

QUANTITY				VALUE			
Dec.		Jan.-Dec.		Dec.		Jan.-Dec.	
1965	1964	1965	1964	1965	1964	1965	1964
(1,000 Lbs.)				($1,000)			
1,517	2,041	27,712	26,341	1,227	1,328	18,685	15,040

Canned: Total purchases of the three principal canned fishery products (tuna, salmon, and sardines) in 1965 were up 61.2 percent in quantity and 65.2 percent in value from those in 1964.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, December 1965 with Comparisons

Product	QUANTITY				VALUE			
	Dec.		Jan.-Dec.		Dec.		Jan.-Dec.	
	1965	1964	1965	1964	1965	1964	1965	1964
	(1,000 Lbs.)				($1,000)			
Tuna	1/	645	8,998	5,714	1/	269	4,063	2,513
Salmon	3	1	4,166	2,751	2	1	2,671	1,632
Sardines	28	11	981	312	15	7	412	181

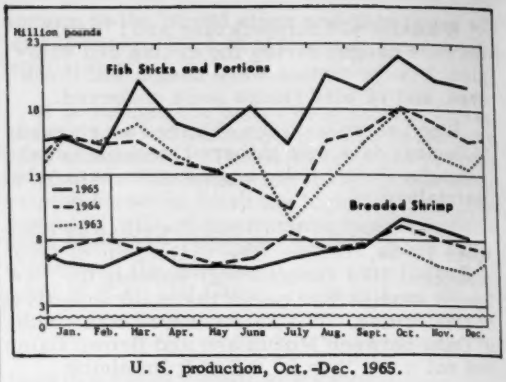
1/Not available.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than shown because data on local purchases are not obtainable.

Fish Sticks and Portions

U. S. PRODUCTION, OCT.-DEC. 1965:

United States production of fish sticks and fish portions amounted to 61.8 million pounds during the fourth quarter of 1965, according to preliminary data. Compared with the same quarter of 1964, this was an increase of 10.8 million pounds or 21.2 percent. Fish portions (39.0 million pounds) were up 8.1 million pounds or 25.6 percent, and fish sticks (22.8 million pounds) were up 2.9 million pounds or 14.3 percent.



U. S. production, Oct.-Dec. 1965.

Cooked fish sticks (21.3 million pounds) made up 93.3 percent of the October-December 1965 fish stick total. There were 38.2 million pounds of breaded fish portions produced, of which 28.3 million pounds were raw. Unbreaded fish portions amounted to 784,000 pounds.

Table 1 - U. S. Production of Fish Sticks by Months and Type, October-December 1965 1/

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
October	7,373	482	7,855
November	7,078	525	7,603
December	6,844	511	7,355
Total 4th Qtr. 1965 1/	21,295	1,518	22,813
Total 4th Qtr. 1964	18,653	1,308	19,961
Total 1965 1/	77,230	4,849	82,079
Total 1964	67,810	5,764	73,574

1/Preliminary.

Table 2 - U. S. Production of Fish Portions by Months and Type, October-December 1965 1/

Month	Breaded			Unbreaded	Total
	Cooked	Raw	Total		
	(1,000 Lbs.)				
October	3,795	9,925	13,720	342	14,062
November	2,920	9,547	12,467	152	12,619
December	3,194	8,849	12,043	290	12,333
Total 4th Qtr. 1965 1/	9,909	28,321	38,230	784	39,014
Total 4th Qtr. 1964	5,643	24,652	30,295	747	31,042
Total 1965 1/	30,485	106,355	136,840	2,598	139,438
Total 1964	20,956	82,816	103,772	2,541	106,313

1/Preliminary.

The Atlantic States remained the principal area in the production of both fish sticks and fish portions, with 18.3 and 24.2 million pounds, respectively. The Pacific States

ranked second with 2.3 million pounds of fish sticks, but the Gulf States ranked second in production of fish portions with 14.0 million pounds.

Florida

EDA GRANT TO PROVIDE NEW WATER LINES TO FISHERY PLANTS:

Approval of a $19,000 grant to the City of Apalachicola, Florida, to help finance the extension of water and sewer facilities to three fishery industrial plants was announced on February 18, 1966, by the Assistant Secretary of Commerce for Economic Development.

The lines will serve the new plant of a seafood-canning company and two other small seafood-processing companies. The project will cost $38,000 with Apalachicola matching the public works grant by the Economic Development Administration (EDA), U. S. Department of Commerce.

The seafood-canning company is ready to begin operations when the water and sewer project is completed, which should be in about four months.

Apalachicola is in Franklin County, a West Florida County which borders on the Gulf of Mexico to the south. The area has been plagued by high unemployment. The unemployment rate for 1964 was 9.5 percent. The new seafood-processing plants are part of the county's overall plan for stabilizing the economy.

Great Lakes

MICHIGAN CONSERVATION COMMISSION PROPOSES NEW REGULATION ON YELLOW PERCH AND NORTHERN PIKE FISHING:

Proposals aimed at liberalizing the catch of yellow perch and banning the take of northern pike by Great Lakes commercial fishermen were to come up for consideration along with important land matters when the Michigan Conservation Commission met February 10-11 in Lansing.

In a move to improve perch populations in the Great Lakes, the Conservation Department was recommending removal of size limits for processed and "in the round" perch and, with one exception, an end to closed commercial seasons on those fish.

The lone exception, involving about a 50-mile stretch of Saginaw Bay and Lake Huron waters, is designed to eliminate conflicts between commercial and sport fishermen during the peak of the tourist season. It calls for a June 10-September 10 shutdown on commercial perch fishing in waters shallower than 18 feet between Point AuGres and Harrisville.

Another change recommended by the Department will, if approved by the Commission, put northern pike off limits to Michigan's Great Lakes commercial fishermen.

Protection of northern pike from commercial fishing is recommended because they are of major interest to anglers and of only incidental importance to commercial operators. The proposed step is in keeping with Department efforts to improve and encourage sport fishing in the Great Lakes.

Great Lakes Fishery Investigations

SEA LAMPREY CONTROL RESEARCH, DECEMBER 1965:

Winter conditions confined field work of the Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich., during December 1965, to the operation of the all-weather screen and trap on the Big Garlic River, fyke-net fishing in the Ocqueoc River, and tagging of adult sea lampreys. A record downstream migration of recently transformed sea lampreys occurred in the Ocqueoc River. The total number reached 9,000 lampreys by December 19, 1965. A large portion of them has been retained at the Hammond Bay laboratory for use in

developing marking techniques. Seven groups of 100 have been marked using fluorescent dyes, nonfluorescent dyes, tail-clip marks, and a herring loop tag. Although the tagging of adult sea lampreys in the upper three lakes declined in December, the operation resulted in 1,669 individuals tagged to December 13. A total of 121 marked animals had been recovered to mid-December.

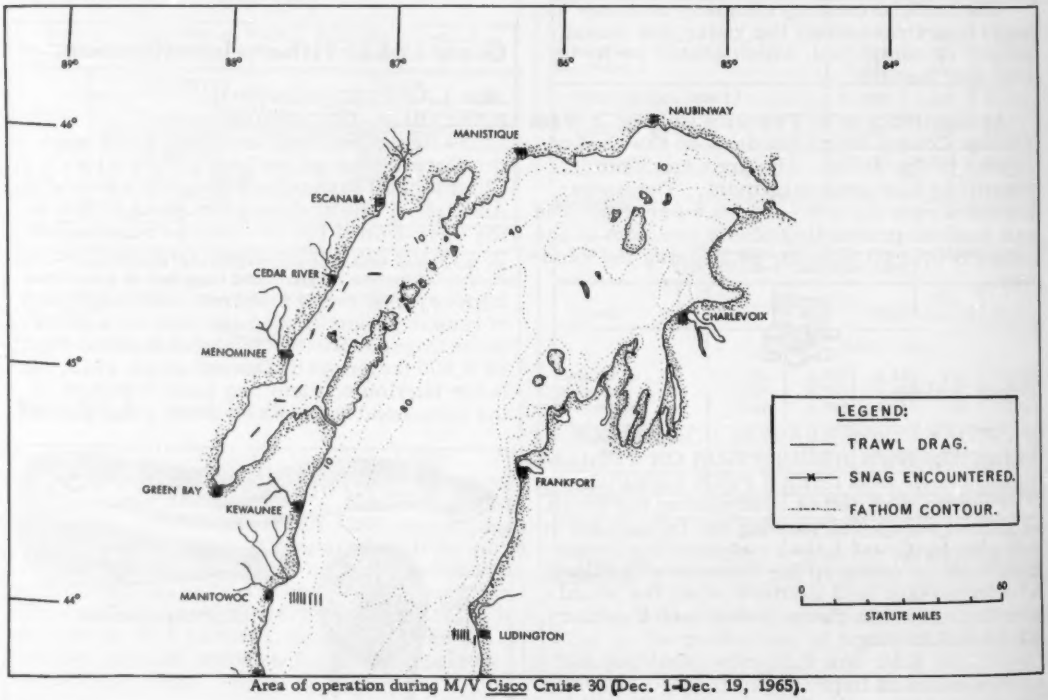
Great Lakes Fisheries Explorations and Gear Development

LAKE MICHIGAN TRAWLING STUDIES:

M/V "Cisco" Cruise 30 (December 1-19, 1965): A 19-day exploratory fishing cruise in Northern Lake Michigan and Green Bay was completed December 19, 1965. The primary objective was to extend knowledge regarding the seasonal and bathymetric distribution, abundance, and availability of alewife, chub, smelt, and yellow perch stocks. Other objectives were to: (1) collect fish, water and bottom samples for botulism studies, (2) obtain length-frequency data and scale samples from chubs, alewife, and yellow perch to supplement biological studies, (3) collect plankton samples for limnological observations, (4) collect alewife, chubs, sculpins, trout perch, and shiners for food habits studies, (5) collect sculpins and smelt for technological studies, (6) collect various fish for radioactivity observations, (7) collect various fish for pesticide studies, (8) collect and preserve lake trout for rehabilitation evaluations, and (9) train personnel in trawling operations.

Commercially significant catches of alewife (up to 2,000 lbs. per half-hour drag) were caught in both Lake Michigan and in Green Bay areas. Commercially significant catches of chubs (up to 300 lbs.) were caught on both sides of Lake Michigan and significant catches of smelt were landed throughout Green Bay. A highlight of the cruise was the recovery of 9 lake trout in Lake Michigan and 4 in Green Bay. The trout, which were planted this spring, are showing a good growth rate with the largest specimen 11.1 inches long.

FISHING OPERATIONS: A total of 23 drags were completed with a 52-foot (headrope) fish



Area of operation during M/V Cisco Cruise 30 (Dec. 1-Dec. 19, 1965).

trawl, 14 in the open lake and 9 in Green Bay. All drags were 30 minutes each, except 2 which were ended early due to encounters with snags and the presence of set fishing gear. Bottom topography and vertical distribution of fish were continuously monitored and recorded with a high resolution echo-sounder.

FISHING RESULTS: Lake Michigan: Off Ludington commercially significant catches of alewives were landed at all depths from 10 to 30 fathoms with the best landing of 1,300 lbs. taken at 20 fathoms. A commercially significant landing of 300 lbs. of chubs in 25 minutes was made at 30 fathoms. Off Manitowoc commercially significant catches of alewives (750 and 1,000 lbs.) were made at 30 and 25 fathoms, respectively, and significant chub catches (250 to 300 lbs.) were made at 35, 40, and 45 fathoms. Catches of smelt, yellow perch, and whitefish were light off both stations. Eight of the 13 lake trout recovered during the cruise were taken off Manitowoc.

Green Bay: Alewife were gone from the shallow waters of Green Bay by December 15. The deep waters near Washington Island yielded 450 and 2,000 lbs. from 17 and 19 fathoms, respectively. Jumbo size smelt were located throughout the bay and 4 drags produced 100 to 250 lbs. Yellow perch were landed in good amounts in the southern portion of the bay. Four fin-clipped lake trout were recovered near Washington Island.

HYDROGRAPHIC DATA: Surface and fishing (bottom) temperatures were the same in Green Bay and Lake Michigan and ranged from 32° to 39° F.

Note: See Commercial Fisheries Review, Jan. 1966 p. 33.

Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, 1964-1965: Based on domestic production and imports, the United States available supply of fish meal for 1965 amounted to 500,646 short tons--173,749 tons (or 25.8 percent) less than during 1964. Domestic production was 5,272 tons (or 2.2 percent) less, and imports were 168,477 tons (or 38.4 percent) lower than in 1964. Peru continued to lead other countries with shipments of 209,801 tons.

U. S. Supply of Fish Meal and Solubles, 1964-1965

Item	Total 1965	Total 1964
	. . . (Short Tons) . . .	
Fish Meal and Scrap:		
Domestic production:		
Menhaden	172,158	160,349
Tuna and mackerel	26,423	21,113
Herring	12,050	8,881
Other	19,349	44,909
Total production	229,980	235,252
Imports:		
Canada	43,830	54,769
Peru	209,801	348,025
Chile	5,651	12,942
Norway	78	-
So. Africa Rep.	5,100	18,581
Other countries	6,206	4,826
Total imports	270,666	439,143
Available fish meal supply	500,646	674,395
Fish Solubles:		
Domestic production	93,853	93,296
Imports:		
Canada	1,488	1,632
So. Africa Rep.	-	987
Other countries	3,650	1,886
Total imports	5,138	4,505
Available fish solubles supply.	98,991	97,801

The United States supply of fish solubles during 1965 amounted to 98,991 tons--an increase of 1.2 percent as compared with 1964. Domestic production and imports of fish solubles increased 0.6 percent and 14.1 percent, respectively.

* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production by Areas, January 1966: Preliminary data as collected by the Department of the Interior's Bureau of Commercial Fisheries:

U. S. Production[1/] of Fish Meal, Oil, and Solubles, January 1966 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles
	Short Tons	1,000 Pounds	Short Tons
January 1966:			
East & Gulf Coasts	1,113	247	490
West Coast[2/]	1,664	211	682
Total	2,777	458	1,172
January 1965 total	2,770	573	907

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.

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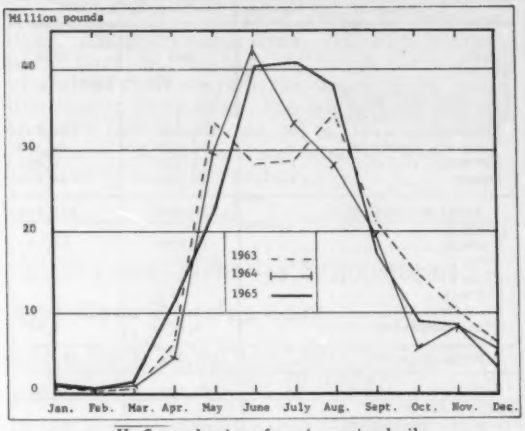
Production, December 1965: During December 1965, a total of 9,245 tons of fish meal and 3.1 million pounds of marine-animal oil was produced in the United States. Com-



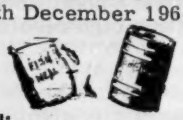
U. S. production of marine-animal oils.

U. S. Production of Fish Meal, Oil, and Solubles, December 1965[1] with Comparisons

Product	Dec. 1/1965	Dec. 1964	Jan.-Dec. 1/1965	Jan.-Dec. 1964
	(Short Tons)			
Fish Meal and Scrap:				
Herring	2/	100	12,050	8,881
Menhaden 3/	6,783	5,047	172,158	160,349
Tuna and mackerel	1,769	1,874	26,423	21,113
Unclassified	993	643	19,349	34,809
Total[4]	9,245	7,664	229,980	225,152
Fish Solubles:				
Menhaden	1,373	1,693	72,948	68,738
Other	1,461	1,046	20,905	24,558
Total	2,834	2,739	93,853	93,296
	(1,000 Pounds)			
Oil, body:				
Herring	240	93	7,767	10,354
Menhaden 3/	2,357	5,293	172,037	157,730
Tuna and mackerel	365	218	5,458	4,816
Other (inc. whale)	105	138	5,402	7,298
Total oil	3,067	5,742	190,664	180,198

1/Preliminary data.
2/Included in "unclassified."
3/Includes a small quantity of thread herring.
4/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

pared with December 1964 this was an increase of 1,581 tons of fish meal but a decrease of about 2.7 million pounds of marine-animal oil. Fish solubles production amounted to 2,834 tons--an increase of 95 tons as compared with December 1964.



Maine Sardines

CANNED STOCKS, JANUARY 1, 1966:

Canners' stocks of Maine sardines on January 1, 1966, were down 18,000 cases from those of the same date in 1965, and down 572,000 cases from stocks on hand 3 years ago.

The new Maine sardine canning season opened on the traditional date of April 15, 1965, and the pack to December 31, 1965, totaled 1,236,000 standard cases, as compared with the pack of 851,000 cases during the same period of 1964.

The new law legalizing year-round canning of Maine sardines, in effect for the first time in 1966, removed the traditional December 1 closing date for the packing season. The new legislation opened winter canning to all Maine sardine packers and allows winter canning with domestic as well as imported herring. None of the Maine sardine canneries have been in operation since early December due to rough seas and few fish, but several were in readiness for production.

The 1966 pack of canned Maine sardines through March 1 totaled 26,000 standard cases (100 3¾-oz. cans), according to the Maine Sardine Council. This is the first January-February pack under the revised Maine law which permits year-round canning. About six plants operated during the period. Fishing has been limited due to adverse weather conditions.

Note: See Commercial Fisheries Review, February 1966 p. 23.

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1966, with Comparisons[1]

Type	Unit	1965/66 Season 1/1/66	11/1/65	1964/65 Season 7/1/65	6/1/65	4/1/65	1/1/65	11/1/64	1963/64 7/1/64	6/1/64	4/1/64	1/1/64	11/1/63
Distributors	1,000 actual cases	267	289	194	198	236	238	291	234	254	291	261	308
Canners	1,000 std. cases[2]	520	689	295	203	314	538	629	514	499	658	1,063	1,255

1/Table represents marketing season from November 1-October 31.
2/100 3¾-oz. cans equal one standard case.
Note: Beginning with the Canned Food Report of April 1, 1963, U. S. Bureau of the Census estimates of distributors' stocks were based on a revised sample of merchant wholesalers and warehouses of retail multiunit organizations. The revised sample resulted in better coverage. The January 1, 1963, survey was conducted with both samples to provide an approximate measure of the difference in the two samples. That survey showed that the estimate of distributors' stocks of canned Maine sardines from the revised sample was 13 percent above that given by the old sample.
Source: U. S. Bureau of the Census, Canned Food Report, January 1, 1966.

North Atlantic Fisheries Investigations

DISTRIBUTION OF ZOOPLANKTON STUDIED:

M/V "Rorqual" Cruise 1-66 (January 5-February 6, 1966): To determine the inshore-offshore and vertical distribution of zooplankton with regard to hydrographic conditions in the Gulf of Maine from Cape Ann to Machias Bay were the objectives of this cruise by the Interior's Bureau of Commercial Fisheries research vessel Rorqual.

The Gulf of Maine zooplankton population was at the annual minimum. Zooplankton volumes along the coast were approximately three times lower than values obtained during the winter of 1965, but were similar to the 1964 winter coastal volumes.

Eleven invertebrate taxa were represented in the samples. Of this number, copepods were the dominant forms constituting 97 percent of the taxa collected. The most numerous copepod species was Calanus finmarchicus. Little areal differences were found in the abundance of C. finmarchicus. Of the remaining eleven copepod species in the samples, only Pseudocalanus minutus was found in significant numbers.

Herring larvae were present at four of the coastal continuity stations in the western and central Gulf coast. A total of 15 larvae were collected, ranging from 26.8 mm. to 35.2 mm. (about 1.06 to 1.37 inches) in length.

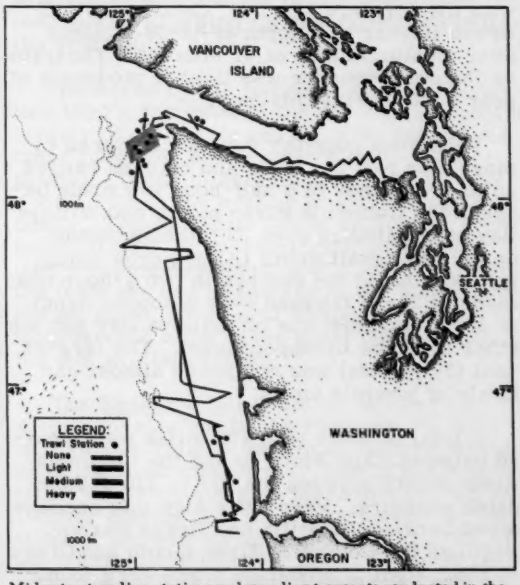
Note: See Commercial Fisheries Review, January 1966 p. 42.

North Pacific Fisheries Explorations and Gear Development

HAKE AND ANCHOVY POPULATION SURVEY CONTINUED:

M/V "John N. Cobb," Cruise 75 (January 10-28, 1966): The primary objectives of this cruise by the Department of the Interior's Bureau of Commercial Fisheries research vessel John N. Cobb were to (1) obtain data on the geographic and bathymetric distribution of anchovies (Engraulis mordax) during the month of January; (2) determine if the $\frac{2}{3}$-scale $\frac{3}{4}$-inch mesh version of the Mark II "Cobb" pelagic trawl is capable of catching northern anchovies in commercial quantities; and (3) obtain biological information on northern anchovy. Secondary objectives were to (1) evaluate the fishing configuration of the $\frac{2}{3}$-scale anchovy net using SCUBA-equipped divers; (2) survey selected areas of Puget Sound for Pacific hake (Merluccius productus); (3) obtain samples of northern anchovy for proximate composition analysis by the Bureau's Seattle Technology Laboratory; and (4) obtain bathythermograph data for the U.S. Navy ASWEPS program. Area of operation was in Puget Sound, Strait of Juan de Fuca, and off Washington coast.

The following two midwater trawls were fished during this survey: (1) Standard Mark II "Cobb" pelagic trawl constructed of 3-inch mesh multifilament webbing with a 25-foot $\frac{1}{2}$-inch liner inserted in the cod end, and (2) $\frac{2}{3}$-scale version of the Standard Mark II "Cobb" pelagic trawl, constructed of $\frac{3}{4}$-inch mesh multifilament webbing. Both trawls were fished with the standard two aluminum hydrofoil-type otter boards and 30-fathom bridles. A high-resolution, low-frequency echo-sounder was used to locate fish, and a dual electric depth-telemetering system, with the depth-sensing units at the ends of the bottom wings of the trawl, was used to monitor the fishing depth of the net.



Midwater trawling stations and sounding transects conducted in the Strait of Juan de Fuca and off the Washington coast during M/V John N. Cobb Cruise 75. Shading of transects depicts the relative strength of midwater echo-sounding traces.

Onshore-offshore sounding transects were made at oblique angles to shore between the 15- and 220-fathom depth contours (see chart). When fish schools were located with the sounder, they were fished to ascertain their species composition. The geographic size of anchovy schools was determined by closely spacing sounding transects in the area of the school. Length measurements were made on the major species in all hauls. A bathythermograph cast was made after each haul.

Nineteen drags, 9 with the $\frac{2}{3}$-scale $\frac{3}{4}$-inch mesh trawl and 10 with the Standard Mark II "Cobb" trawl, were made during the cruise. Anchovy was the dominant species taken followed by herring (Clupea pallasii), yellowtail rockfish (Sebastodes flavidus), pollock (Theragra chalcogrammus), and dogfish (Squalus acanthias).

WASHINGTON COAST: Twelve hauls, 6 with the $\frac{2}{3}$-scale $\frac{3}{4}$-inch trawl and 6 with the Standard Mark II "Cobb" trawl, were made along the Washington coast from off Mukkaw Bay to the Columbia River mouth at depths from 16 to 88 fathoms. Anchovy was the dominant species encountered in all hauls except two, with catches ranging from a trace to 1,000 pounds. This latter haul was made with the Standard Mark II "Cobb" trawl off Grays Harbor at a depth of 23-26 fathoms over a bottom depth of 41 fathoms. The trace on the echo-sounder was light to moderate at gear depth during this haul.

Yellowtail rockfish were encountered in more than half the hauls and catches ranged up to 400 pounds in a half-hour tow made between the Columbia River mouth and Willapa Bay at 26 fathoms over 33 fathoms bottom depth. Whitebait smelt (Allosmerus elongatus) dominated the catches in two $\frac{1}{2}$-hour tows made at 20-28 fathoms over a bottom depth of 30-35 fathoms; one off Willapa Bay and the other off Cape Disappointment. The largest haul (30 pounds) was composed almost entirely of juvenile smelt.

A total of more than 400 miles was scouted between Cape Flattery and the Columbia River mouth between the 13- to 220-fathom depth contours. Very little sign was encountered between Umatilla and Grays Harbor. Between the Columbia River mouth and Grays Harbor, light to moderate signs were found between the 20- and 50-fathom depth contours. Smelt, anchovy, and yellowtail rockfish were dominant in the catches made in this sign.

Between Umatilla and Tatoosh moderate to heavy sign was encountered at depths from 60-80 fathoms over a bottom depth of 60-120 fathoms. In the area southwest of Mukkaw Bay this sign was extremely heavy, and was located at an average depth of 70 fathoms over an average bottom depth of 90 fathoms. Two hauls made in this sign with the $\frac{2}{3}$-scale $\frac{3}{4}$-inch mesh trawl yielded predominantly anchovy, with the largest tow producing 400 pounds in one-half hour. The fish ranged from 10 to 18 cm. (3.9-7.1 inches) and averaged 14.2 cm. (5.6 in.) in length. Sounding transects showed this school to be approximately 5 miles long by 2 miles wide and from 10 to 20 fathoms in thickness. This sign was observed to rise to within 18 fathoms of the surface after sundown, at which time a one-half hour tow in this echo-sounding trace also produced predominantly anchovy (50 pounds). These fish were smaller than those taken during the day, averaging 10.6 cm. (4.17 inches) in length with a range of 9-12 cm. (3.5 to 4.7 inches). Four hours of surface nightlighting over this strong sign failed to produce any sign of anchovy at the surface.

No hake were encountered off the Washington coast during the survey.

STRAIT OF JUAN DE FUCA: More than 200 miles were echo-sounded in the Strait over depths from 15 to 140 fathoms. An intensive echo-sounding survey was made in Discovery Bay where a heavy echo trace, 10 fathoms thick, was recorded at the entrance in 41 fathoms over a bottom depth of 55 fathoms. A 25-minute tow with the $\frac{2}{3}$-scale $\frac{3}{4}$-inch mesh trawl caught mainly herring (250 pounds) and pollock (35 pounds). The herring ranged in size from 11 to 24 cm. (4.3 to 11.5 in.) and averaged 18.4 cm. (7.2 in.) in length. Three other tows made in the Strait on light sign did not yield any significant fish catches, although 25 pounds of a mysid (Neomysis rayi) were taken off Wada Island. No hake and only a trace of anchovy were encountered in these hauls.

PUGET SOUND: Four days at the beginning of the cruise and two at the end were spent in Puget Sound. Echo-sounding surveys were conducted in various localities in the Sound, especially in Saratoga Passage and Holmes Harbor in northern Sound and Case and Carr Inlets in southern Sound. Light to moderate sign was found over the central part of Saratoga Pass-

age mainly between the 25- and 50-fathom depth contours. Unfortunately winds in excess of 50 knots prevented this trace from being evaluated. In Carr and Case Inlets, moderate to heavy echo traces 3-5 fathoms thick were recorded at a depth of 35 fathoms over most of both inlets. Two 15-minute tows with the Standard Mark II "Cobb" trawl in the echo trace in Carr Inlet produced mainly herring, pollock, and dogfish with the larger tow yielding 200, 100, and 30 pounds of those species respectively. The herring ranged in size from 10 to 25 cm. (3.9 to 9.8 in.) in length, averaging 13.0 cm. (5.1 in.). Thirty-four hake, ranging in length from 14-21 cm. (5.5 to 8.3 in.) and averaging 18.2 cm. (7.2 in.) were also taken in this tow. The single 15-minute tow in Case Inlet yielded a higher percentage of dogfish (60 pounds), 30 pounds of herring, and only 5 small hake. The herring in this tow ranged from 10 to 23 cm. (3.9 to 9.0 in.), averaging 17.1 cm. (6.7 in.) in length.

A 15-minute gear trial at 70-100 fathoms over an average bottom depth of 121 fathoms off Golden Gardens produced several hake of various sizes.

GEAR EVALUATION: With the $\frac{2}{3}$-scale $\frac{3}{4}$-inch mesh version of the Standard Mark II "Cobb" trawl fishing at 12 fathoms, SCUBA-equipped divers dived on the net to evaluate its fishing configuration. The mouth opening was approximately 35 feet wide (measured) by 25 feet deep (estimated). These figures are not maximal as excessive amounts of "hang-in" on the crisscross rib lines prevented the trawl from operating optimally. Towing speeds recorded during actual fishing trials with this gear ranged from 2.4 to 2.9 knots at engine speeds of 260 to 330 r.p.m. (full speed), respectively. Those towing speeds are slightly greater than those experienced with the Standard Mark II "Cobb" trawl at similar engine speeds.

It is not possible to accurately evaluate the catching efficiency of the $\frac{2}{3}$-scale $\frac{3}{4}$-inch trawl for catching anchovy from our limited data. The largest catch was only 400 pounds of anchovy in a one-half-hour tow. This haul was less than the largest catch (1,000 pounds) made with the Standard Mark II "Cobb" trawl. But this latter haul, which was slightly less than one hour in duration, was made at sundown at full speed on a slowly ascending, moderate trace. Therefore, it is not known to what extent increased towing speed, fish abundance, fishing after sundown, and/or other variables might have increased the catching efficiency of the trawl for anchovy.

OTHER ACTIVITIES: Samples of anchovy were retained and frozen from most hauls for proximate composition studies by the Seattle Technology Laboratory. All hake were also saved for aging by the Seattle Biological Laboratory.

A bathythermograph cast was made after each haul and ten additional casts were made for the Navy. Three bathythermograph casts and four plankton tows were taken in Saratoga Passage.

Note: See Commercial Fisheries Review, February 1966 p. 26.

Oceanography

ANTARCTIC OCEAN BIOLOGICAL STUDY: Three marine scientists from the Institute of Marine Science, University of Miami, are participating in the first phase of a new intensive study of the Antarctic Ocean. They left Miami on January 12 for Punta Arenas, Chile, where they boarded the U. S. Coast Guard icebreaker Eastwind for the expedition into the south polar seas.

Sponsored by the National Science Foundation (NSF), the work of the scientists consists largely of collecting and studying yeasts and other fungi and phytoplankton (planktonic plants). These microscopic organisms play a vital role in the cycling of nutrients in the ocean. The Antarctic Sea is an area of great productivity. Its nutrient-rich waters support a prodigious quantity of animal life ranging from the tiny creatures of the plankton to the penguins, seals, and whales. The role of microscopic fungi in the great chain of life in the sea will be studied.

The Eastwind left Chile on January 16. After crossing the Drake Passage, the ship will stop at Palmer Station on Anvers Island, near the Antarctic Circle. One of the scientists will leave the ship there and remain at Palmer Station for five weeks making collections of terrestrial and inshore fungi. He will utilize the laboratory facilities recently set up by the U. S. Antarctic Research Program.

In the meantime, the other two scientsts will collect fungi and phytoplankton from the

waters off the Palmer Peninsula, which juts out from the continent of Antarctica in the direction of South America, 700 miles away. They will be accompanied by scientists from NSF, the Smithsonian Institution, Florida State University, and the University of Hawaii, who will study deep-water corals, birds, insects, bacteria, and bottom sediments.

The cruise was scheduled to end in early March. Later that month, 2 of the scientists were to join the NSF's research vessel the USNS Eltanin for a second cruise in Antarctic waters from Chile to New Zealand.

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MARINE SCIENTIST STUDIES ANTARCTIC OCEAN SQUID AND OCTOPOD:

A scientist of the Institute of Marine Science, University of Miami, left south Florida early in January 1966 for the frigid south polar seas. He joined the National Science Foundation's Antarctic research ship USNS Eltanin for a two-month cruise in the Drake Passage, Scotia Sea, and the waters surrounding South Georgia, South Sandwich Islands, South Orkneys, the Falkland Islands, and the Palmer Peninsula. He is the sixth scientist from the Institute to do field work in the Southern Ocean in an investigation of the occurrence, distribution, and biology of the squid and octopod in a program directed by the Institute's Division of Biological Sciences.

Supported by the Office of Antarctic Programs under the National Science Foundation, earlier Eltanin cruises with Institute scientists aboard have been from Valparaiso, Chile, to New Zealand and return, working as far south as the pack ice permitted operations. Previous cruises have been made during the Antarctic winter when the Southern Ocean is at its worst. This cruise will be the first made during the Antarctic summer.

Studies have revealed large numbers of squid and bottom-dwelling octopod in the waters surrounding the Antarctic continent and several scientific papers are now ready on various species taken on the cruises. Squid in Antarctica form a large part of the diet of the sperm whale, various seals, and numerous sea birds. With the exception of fish, they constitute the largest food source in the oceans and their study is of importance to many nations.

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UNIVERSITY OF MIAMI'S RESEARCH VESSEL "JOHN ELLIOTT PILLSBURY" BEGINS 9-WEEK SURVEY:

A 9-week oceanographic survey of the Straits of Yucatan, the Bartlett Deep, the Brownson Deep, and the area along the coast of South America from the Guianas to the Amazon River by the research vessel John Elliott Pillsbury began on January 28, 1966. The 176-foot vessel is operated by the Institute of Marine Science, University of Miami, Miami, Fla.

Chief Scientist for the first half of the cruise (from Miami to Brazil and back to Trinidad) will be an oceanographic chemist. A total of 13 marine scientists and technicians comprised the scientific party. Temperature measurements and water samples will be taken at each of 48 different locations, or stations. Water samples will be analyzed to determine their content of oxygen, salts and trace elements. Studies will also be made of the chlorophyll content of water and of the abundance of living planktonic organisms.

After working in the Straits of Yucatan, between the western tip of Cuba and Mexico, research vessel John Elliott Pillsbury will proceed south to the coast of Honduras, then north and east to the Bartlett Deep (depth: 20,568 feet), near Jamaica; then east to the Brownson Deep (depth: 28,680 feet), off Puerto Rico. Profiles of the bottom of those great deeps--the deepest spots in all the Atlantic--will be made with a precision depth recorder.

After leaving the Brownson Deep, the scientists will proceed south to Venezuela and around the northeastern coast of South America to the mouth of the Amazon River. In the Amazon basin and off Surinam, they will investigate areas of upwellings.

On this survey, for the first time, the Institute's scientists will utilize each day the computer facilities at the Institute's campus on Virginia Key, near Miami. Data from the various samples will be sent by radio to Miami and run through a computer. Within 48 hours, the scientists aboard the research vessel will have results that ordinarily would take a much longer period of time. This system will speed up the work at sea considerably.

The first half of the cruise will end at Trinidad on March 2, at which time a new group of scientists headed by a marine geolo-

gist will take over. For the next four weeks, deep-coring operations will be conducted in the Caribbean, the Bahamas, and on the Blake Plateau, east of Florida. (News of Institute of Marine Science, Miami, Fla., January 27, 1966.)

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STUDY SHEDS NEW LIGHT ON GULF STREAM:

A study of the Gulf Stream now under way by U. S. oceanographers is shedding new light on this mysterious "ocean river." Data obtained during the first quarter of a scheduled year-long investigation, the most intensive of its kind ever attempted, are providing scientists with material upon which more definite conclusions regarding the nature of the Gulf Stream may ultimately be reached.

The undertaking, in which 15 governmental and private groups are participating, is being coordinated by the Institute for Oceanography, a component of the U. S. Department of Commerce's Environmental Science Services Administration (ESSA).

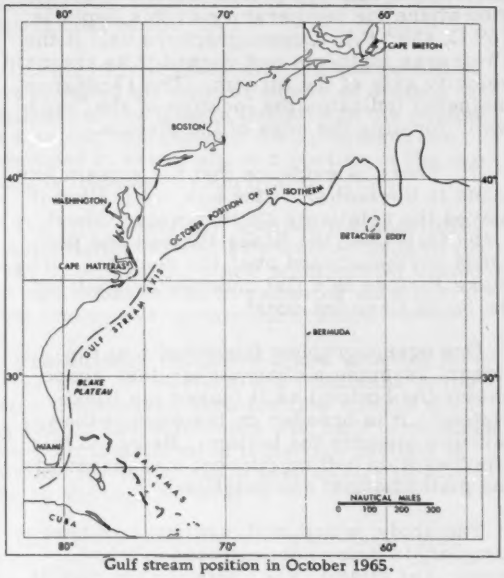
Participants include ships, planes, and scientists of ESSA's Institute for Oceanography, Coast & Geodetic Survey, and Weather Bureau; Naval Oceanographic Office; Office of Naval Research; Coast Guard; Interior Department's Bureau of Sport Fisheries and Wildlife; University of Miami; Duke University; Columbia University's Lamont Geological Observatory; University of Rhode Island; Massachusetts Institute of Technology; Woods Hole (Mass.) Oceanographic Institution; New York University; and Lerner Marine Laboratory, Bimini, Bahamas.

Although no formal reports have yet been made, preliminary findings disclosed the following:

1. The Gulf Stream expands and contracts like a living thing, but with an apparent irregularity that so far defies prediction.

2. The stream fluctuates like an undulating body. During the initial three-month period of the study (September through November), the position of the stream fluctuated as much as 250 miles, changing at times 15 to 20 miles a day. From September to October, a fluctuation of 200 miles was measured; from October to November, about 100 miles. The studies revealed that the stream's course varied more and more the farther it went from the North American coast.

This extensive fluctuation was observed about 800 miles out to sea from Cape Hatteras, N.C., where the giant stream veers northeast toward Europe after flowing up the U.S. coast from the Straits of Florida.



Gulf stream position in October 1965.

3. In that area, the stream was found to migrate in northerly and southerly directions. After leaving Cape Hatteras, the stream proceeded north to about the same latitude as New York City, then veered south about 150 miles to the latitude of Washington, D. C., then north again some 210 miles to the latitude of Boston, then south once more approximately 150 miles to the latitude of Philadelphia.

4. These sharp fluctuations in the stream's course are known as meanders. The meander which fluctuated between Washington and Boston was observed in October. By November, the stream had apparently straightened out considerably, for the October meander was no longer so pronounced.

5. From time to time, part of a meander will break off, forming an eddy. The eddies remain unconnected with the stream until they disappear. One eddy 60 miles in diameter was discovered in September south of the stream (none has yet been found to the north).

It whirled counterclockwise around its 180-mile circumference at a speed of about one-third revolution per day.

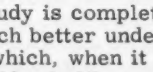
6. The stream is detected most readily after it leaves Cape Hatteras at a depth of about 600 feet, where the temperature changes rapidly across the stream. The maximum surface current appears to lie above the region where the temperature at this depth is 15° C. (59° F.). Oceanographers call it the 15-degree isotherm and regard it as the main velocity axis of the stream. The 15-degree isotherm indicates the location of the "cold wall" forming the edge of the stream.

7. There is evidence that the stream extends to the bottom of the sea, even after it leaves the relatively shallow water (about 2,400 feet) over the Blake Plateau and proceeds northeastward over the deep sea. The Blake Plateau is a flat underwater shelf off the South Carolina coast.

One oceanographer theorized that the stream assumes a champagne-glass shape (minus the bottom) as it leaves the Blake Plateau. It is broader on the top and then narrows towards the bottom. He based this hypothesis on bottom current measurements and mathematical computations.

The study, which will continue into next summer, is being concentrated in these areas: Off Miami, Fla.; between the Straits of Florida and Cape Hatteras off Charleston, S. C.; and in the North Atlantic from Cape Hatteras out into the ocean to the area south of Nova Scotia.

When the study is completed, scientists will have a much better understanding of the great stream which, when it leaves the Straits of Florida, is like a mighty river discharging one hundred billion tons of water each hour. It has been calculated that the Gulf Stream flow is 22 times as large as all the rivers of the world.



Oregon

CHANGES IN FISHERY REGULATIONS CONSIDERED:

Changes in a number of regulations and clarification of others concerned with commercial trolling and shellfish (with the exception of crabs) were proposed for the February 1966 meeting of the Oregon Fish Commission.

The West Coast Trollers Association has requested a regulation hearing and has proposed an earlier opening of the chinook trolling season, at present set for April 15. The matter was to be considered at the meeting. The troll fishing area boundary at the mouth of the Columbia River and clarification of minimum size limits of commercial troll-caught coho salmon were also to be considered.

The staff has recommended action be taken to head-off potential problems that could arise from importation of uninspected seed oysters from other countries following a greatly reduced oyster "set" in Japanese waters where nearly all of the seed oysters imported to the Pacific coast have been obtained in the past.

Among the other matters scheduled for consideration was a proposal that the present 4¼-inch minimum possession limit on razor clams handled by Oregon shellfish buyers be applied only to Oregon-harvested razor clams. This would allow Oregon dealers to handle razor clams brought in from Washington where there is no minimum size restriction. (Oregon Fish Commission, February 2, 1966.)

* * * * *

WILLAMETTE FALLS FISHWAY CONSTRUCTION CONTRACT AWARDED:

Award of the contract for construction of Phase A of the long-awaited Willamette Falls fishway was made when the Oregon Fish Commission formally accepted the $705,338 bid submitted by a Portland firm.

Phase A of the project includes construction of an 800-foot section of ladder leading from the cul-de-sac on the west side of the falls to the forebay of the dam. The cul-de-sac has long been a problem since fish bound for the upstream spawning grounds are frequently attracted into the pocket by a heavy flow of water passing through 2 plants. Although dead-ended in this cove, the fish are reluctant to leave the area to seek other means of upstream passage because of the strong water flow here. In years past, industry has been most cooperative in closing down for a period of hours each spring to eliminate this water flow attraction thus encouraging

spring chinook to leave the trap. The new fishway will eliminate the necessity of this measure and will allow free upstream passage of fish from the cul-de-sac at nearly all water stages.

Funds for the undertaking are being provided by the Department of the Interior's Bureau of Commercial Fisheries through the Columbia River Fishery Development Program, and by a Portland company in the proportion of 83.7 and 16.3 percent, respectively.

If the work proceeds as expected, the Phase A section will be ready to accommodate the spring chinook run in 1967. Later that year, fall chinook and increased numbers of coho, resulting from heavy plantings of young fish made in the system in anticipation of completion of the fishway, will return in their spawning run. Many adult coho surplus to hatchery needs also have been transplanted into the upper Willamette during the past two years in a cooperative project with the Oregon Game Commission, assisted by the Department of Interior's Fish and Wildlife Service and the Washington Department of Fisheries.

With assurance that the initial phase will soon be underway, the Commission emphasized the importance of giving attention to Phase B of the project. This includes construction of a two-entrance section which will lead from the main portion of the falls to join a common exit to the forebay with the cul-de-sac leg, replacing the present inefficient ladder. The Commission has made application to the Department of the Interior's Bureau of Commercial Fisheries for funds for Phase B work. In addition, the Governor of Oregon has requested the assistance of the State's congressional delegation in efforts to obtain Federal financial support for the project. Oregon's entire congressional delegation has indicated support of this facility. (Oregon Fish Commission, February 4, 1966.)

Oysters

EDA APPROVES PROJECT TO STUDY SEEDED BEDS IN CHESAPEAKE BAY:

A study to determine the feasibility of establishing commercial oyster hatcheries in the lower Chesapeake Bay area of Virginia was approved Feb. 11, 1966, by the Assistant Secretary of Commerce for Economic Development.

Approximately $38,050 in Federal funds for the project will come from the Economic Development Administration (EDA), U. S. Department of Commerce. In addition, an oyster company will contribute $11,950 for a total project cost of $50,000.

During recent years disease and pollution have reduced the natural supply of oysters available to the fishing industry in the region. As a result, widespread unemployment has developed in areas where a portion of the economy is dependent upon oyster fishing.

The EDA study will analyze the possibility of establishing artificially-seeded beds in the area, thus creating a new commercial industry that would assist in relieving unemployment among oystermen and seafood workers.

Preliminary testing of a new process for producing seed oysters was conducted in the lower Chesapeake area for five months during 1965. The EDA funds will help to continue research to determine if the new method is suitable for large-scale seed oyster production in Virginia waters.

Currently seeded oysters for the region are supplied primarily by beds in the James River. However, in the past several years such production has decreased by more than 50 percent, causing further decline of the Chesapeake area industry.

Rhode Island

FISHERMEN'S FORUM HELD:

Some 200 fishermen from New York to Maine met with experts on March 5, 1966, at the University of Rhode Island to learn about innovations and developments in the industry. The fishermen's forum was the fifth in a series that began in 1961.

An associate professor of food and resource economics at the University said the day-long program in the Memorial Union was planned in cooperation with a committee of local fishermen to provide information on such topics as aluminum fishing vessels, midwater trawl methods, life saving equipment, and lobster-conservation programs.

Sponsored by the University of Rhode Island Marine Resources Program in cooperation with the Point Judith Fishermen's Cooperative, the Forum included several speakers and a series of question-and-answer periods. Mr. Donald L. McKernan, Director of the Department of the Interior's Bureau of Commercial Fisheries chose as his topic "The Fisherman: His Future in American Fisheries."

A marine industry marketing manager for a large aluminum and chemical corporation had as his subject "Can Trawlers be Built of Aluminum?" A staff member of the Vessel and Gear Section, Industrial Development Service, Canadian Department of Fisheries, described "The British Columbia Midwater Trawl." One of the special requests of fishermen was answered when the chief of the Search and Rescue Branch, Testing and Development Division, U. S. Coast Guard, discussed "New Developments in Life Saving Equipment." An associate professor of oceanography at the University discussed "What Is Good and Bad with the Present Lobster Conservation Program?" The final speaker was the executive secretary of the Congress of American Fishermen, Seattle, Washington. His subject was "What Is the Congress of American Fishermen?" (University of Rhode Island, February 11, 1966.)

Salmon

U. S. PACIFIC COAST CANNED STOCKS, JANUARY 1, 1966:

On January 1, 1966, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 2,259,875 standard cases (48 1-lb. cans)--589,979 cases less than on January 1, 1965, when stocks totaled 2,849,854 standard cases.

On the basis of total stocks of 2,998,745 actual cases (consisting of cans of $\frac{1}{4}$-lb., $\frac{1}{2}$-lb., 1-lb., etc.), red salmon accounted for 1,801,354 cases (mostly 1-lb. and $\frac{1}{2}$-lb. cans) or 60.1 percent of the total canners' stocks on January 1, 1966; pink salmon accounted for 651,279 cases or only 21.7 percent (441,651 cases were 1-lb. talls). Next came chum (263,268 cases, mostly 1-lb. talls), followed by coho or silver (173,560 cases), and king salmon (109,284 cases).

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965,

Table 1 - Total Canners' Stocks of Pacific Canned Salmon, January 1, 1966

Species	Jan. 1, 1966	Dec. 1, 1965	Nov. 1, 1965
	(No. of Actual Cases)		
King	109,284	123,126	140,743
Red	1,801,354	1,902,932	1,983,736
Coho	173,560	193,729	232,458
Pink	651,279	767,120	793,674
Chum	263,268	305,471	328,219
Total	2,998,745	3,292,378	3,478,830

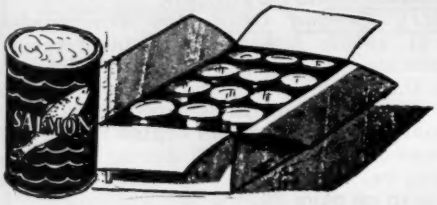
Table 2 - Total Canners' Stocks on Hand January 1, 1966 (Sold and Unsold), by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48/$\frac{1}{4}$-lb.	5,810	226,454	64,637	4,056	66	301,023
48/$\frac{1}{2}$-lb.	90,795	629,660	67,809	187,399	50,543	1,026,206
48/1-lb.	12,382	940,201	32,725	441,651	204,449	1,631,408
12/4-lb.	297	5,039	8,389	18,173	8,210	40,108
Total	109,284	1,801,354	173,560	651,279	263,268	2,998,745

Table 3 - Canners' Shipments from July 1, 1965, to January 1, 1966, by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 $\frac{1}{4}$-lb.	8,390	198,594	60,201	4,437	1	271,623
48 $\frac{1}{2}$-lb.	78,057	353,355	64,739	224,941	43,549	764,641
48 1-lb.	8,349	520,422	75,375	607,986	294,094	1,506,226
12 4-lb.	-42	4,420	5,880	39,766	8,411	58,435
Total	94,754	1,076,791	206,195	877,130	346,055	2,600,925

the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.



Shipments at the canners' level of all salmon species from July 1 to January 1, 1966, totaled 2,014,887 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses): king, 95,503 standard cases (78,155); red, 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 95 percent of the 1965 salmon pack. (Division of Statistics and Economics, National Canners Association, February 4, 1966.)

Note: See Commercial Fisheries Review, February 1966 p. 35.

Shellfish

NATIONAL CONFERENCE ON DEPURATION: A National Conference on Depuration of Shellfish will be held on the campus of the University of Rhode Island, July 19-22, 1966. This conference is sponsored by the Shellfish Sanitation Branch, Public Health Service, with the cooperation of the University of Rhode Island. The purpose is to assemble and exchange current expert knowledge of all aspects of the subject. Subsequently, the information obtained and discussed will be published. All who are interested are welcome to attend. For advance reservations and further information, contact Dr. Carl N. Shuster, Director, Northeast Shellfish Sanitation Research Center, U. S. Public Health Service, DHEW, South Ferry Road, Narragansett, Rhode Island, 02882.

Shrimp

MORE SHRIMP EATEN BY AMERICANS: Americans are eating more shrimp than ever before, reports the Department of the Interior's Bureau of Commercial Fisheries. Total consumption in 1965 is estimated at 323 million pounds, compared with 299 million pounds in 1964.

On a per capita basis, the Bureau reports, Americans are eating about 75 percent more shrimp than in the years immediately following World War II.

The Bureau says there appears to be no single answer to why Americans are consuming more shrimp, but rising purchasing power, growing consumer preference, development of new products, wider distribution, improvement in quality, and increased product promotion have all been contributing factors.

The domestic shrimp industry is primarily in the Gulf States. The United States also imports large quantities of shrimp. Mexico and other Latin American countries, along with India, have been supplying increasing quantities in recent years.

* * * * *

BREADED PRODUCTION, OCTOBER-DECEMBER 1965:

United States production of breaded shrimp during the fourth quarter of 1965 amounted to about 26.5 million pounds--an increase of about 1.8 million pounds or 7.4 percent as compared with the same period in 1964.

Breaded shrimp on conveyor belt moving to weighing and packaging line

Table 1 - U. S. Production of Breaded Shrimp by Areas, October-December 1965

Area	Oct.-Dec. 1965 1/		Oct.-Dec. 1964	
	Number Plants	Quantity 1,000 Lbs.	Number Plants	Quantity 1,000 Lbs.
Atlantic & Gulf	42	24,544	34	23,096
Pacific	7	1,938	8	1,551
Total	49	26,482	42	24,647

1/Preliminary.

Table 2-U. S. Production of Breaded Shrimp by Months, 1964-65

Month	1/1965	1964
	(1,000 Lbs.)	
January	7,442	7,401
February	7,117	8,100
March	8,251	7,303
April	7,366	7,081
May	7,304	6,224
June	7,371	6,641
July	7,401	8,697
August	9,040	7,354
September	9,302	7,885
October	9,475	9,225
November	8,957	7,907
December	8,050	7,515
Total	97,076	91,333

1/Preliminary.

The Atlantic and Gulf States ranked first in the production of breaded shrimp with 24.5 million pounds, followed by the Pacific States with 1.9 million pounds.

South Atlantic Fisheries Explorations and Gear Development

ABUNDANCE AND DISTRIBUTION OF BROWN AND PINK SHRIMP OFF FLORIDA COAST STUDIED:

M/V "Oregon" Cruise 106 (January-January 21, 1966): Assessment of the current abundance and distribution of large brown and pink shrimp south of Cape Kennedy, located during explorations in January 1965, was the primary objective of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon. For areas explored, see map on page 39.

SHRIMP: Sixty 1- to 2-hour drags were made with 40- and 65-foot flat trawls fished on 6- and 8-foot chain doors in depths ranging from 8 to 38 fathoms. Only scattered individual brown and pink shrimp (26-30 and 31-36 heads-off count, respectively) were caught in areas where commercial concentrations were located one year ago. Rock shrimp (Sicyonia brevirostris) were taken in catches of up to 60 pounds per 1-hour drag in 26 to 27 fathoms at 28°07' N. latitude and 80°03' W. longitude. Catches of 21-25 heads-off count white shrimp inside the 15-fathom curve ranged up to 48 pounds per 2-hour drag.

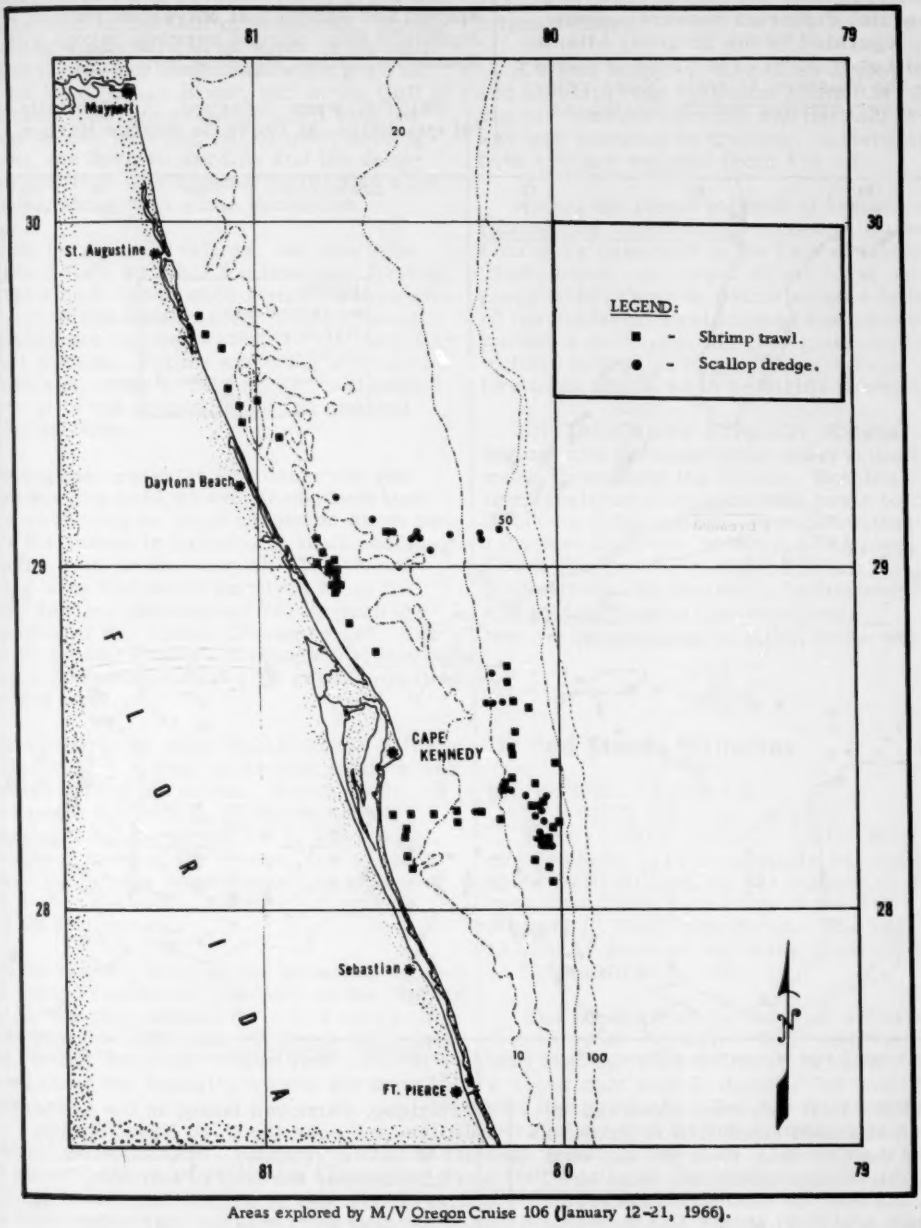
FOOD FISH: Fish catches in the area ranged from 0 to 1,900 pounds per hour drag. The largest catches of individual species were: spots (Leiostomus xanthurus)--1,800 lbs. (avg. 4 lbs.), croakers (Micropogon undulatus)--231 lbs. (avg. 5 lbs.), black sea bass (Centropristes striatus)--87 lbs. (avg. 3 lbs.), and flounder (Paralichthys dentatus)--32 lbs. (avg. 1½ lb. each).

Note: See Commercial Fisheries Review, January 1965 p. 36.

Tropical Atlantic Fisheries Investigations

LIVE BAIT DISTRIBUTION AND TUNA STUDIES:

M/V "Geronimo" Cruise 5 (July 21-November 4, 1965): To investigate the distribution and biology of (1) fish suitable for use as live bait for tuna fishing and (2) surface tunas and other pelagic predators (together with measurements of the physical and biological environment) were the main purposes of this cruise

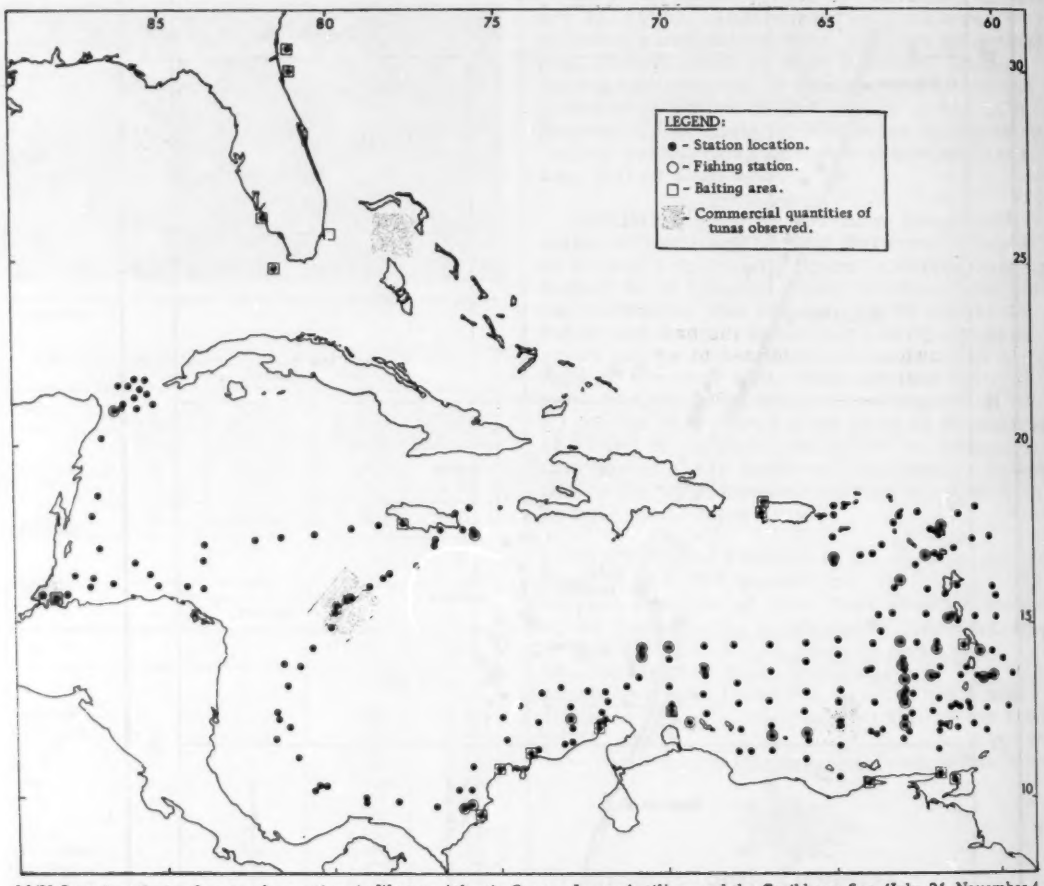


Areas explored by M/V Oregon Cruise 106 (January 12-21, 1966).

by the Department of the Interior's Bureau of Commercial Fisheries research vessel Geronimo operated by the Tropical Atlantic Biological Laboratory. The areas of operation were the Western Atlantic Ocean adjacent to Lesser Antilles and the Caribbean Sea.

In Puerto Rican waters, bait fish were observed and sampled at Mayaguez Harbor and Aquadilla Bay--thread herring, mixed with Spanish sardines (Sardinella).

Bait fish were observed, in potentially useful quantities, at Forte de France Harbor,



M/V Geronimo Cruise 6 area of operations in Western Atlantic Ocean, Lesser Antilles, and the Caribbean Sea (July 21-November 4, 1965).

BAIT FISH: Bait fish were observed in moderate to abundant quantities in numerous areas along the Carolina, Georgia, and east Florida coast. Large quantities were observed off the Florida west coast between Cape Romano and Fort Myers Beach in the 4- to 5-fathom depth range. Thread herring (Opisthonema) appeared to be the most abundant species in these locations, except for Pensacola herring (Harengula) at Miami Beach. Martinique, Cannouan Island in the Lesser Antilles, and near the U. S. Naval Station, Port of Spain, Trinidad. Spanish sardines were taken near the Gulf of Cariaco, Venezuela. Particular locations here at which sardines and anchovies are harvested commercially are at Pt. Araya, Isla Lobos, and Picuda Island.

Abundant bait was found on the northwest coast of Aruba; along the Colombian coast,

particularly at Cape La Vela; off Black River, Jamaica; and in the Gulf of Honduras. Strong prevailing winds hampered much of the baiting operations, but conditions were good at Cape La Vela, Black River, and in the Gulf of Honduras. The most common bait species was the thread herring, but at most baiting stations, the Spanish sardine and the deep-bodied herrings of the genus Harengula also occurred, along with some anchovies.

From these observations, one can infer that small fish, suitable for live-bait fishing, are available in reasonable quantities throughout much of the southeastern United States and Caribbean coastal waters in the July-November season. Future sampling and use of these fish on other surveys will yield information as to the suitability of the several species as chum.

During the cruise it was observed that thread herring held up well in the bait tank, and when thrown as chum tended to swim towards the vessel (a behavioral trait useful in attracting tuna to the vessel). The thread herring from Colombia survived from the time of capture (September 28) through the remainder of the cruise (November 4). The large (6-8 inch) Spanish sardines (Sardinella) obtained in Venezuela died off rapidly, lasting only 2½-3 days.

DISTRIBUTION AND BIOLOGY OF SURFACE TUNAS: A total of 44 fish schools was observed during the cruise. From these, 48 tuna were sampled (6 E. alletteratus; 14 T. albacares; 15 K. pelamis; 13 T. atlanticus). Throughout most of the cruise, few surface schools containing commercial quantities of tunas were observed. Notable exceptions were the following:

While running through the Bahamas Islands area (New Providence Channel) on the night of July 30, the ship passed through a large concentration of bluefin tuna (Thunnus thynnus) of 50- to 150-lb. size. These fish were observed along the vessel's course for over 2½ hours.

At 12° N. and 65° W., an area of commercial concentrations of yellowfin (Thunnus albacares) and skipjack (Katsuwonis pelamis) tuna was encountered. These fish were in compact schools and were in a feeding frenzy. The yellowfin ranged in size from 15-30 lbs.; the skipjack, 3-6 lbs. It was estimated that there were about 80-100 tons of fish in the area, and these could have been captured by a tuna seiner.

A small school (1 to 2 tons) of skipjack and blackfin tuna (Thunnus atlanticus) was sighted between Serrana and Serranilla Banks and was sampled by trolling. Individuals of both species weighed from 4-8 lbs.

Numerous small schools of little tuna (Euthynnus alletteratus) mixed with blackfin tuna were observed in the Gulf of Honduras. These occurred around small coral outcroppings which came to within about 4 fathoms of the surface. Preliminary analysis of temperature data from the Gulf indicates that upwelling was occurring. The waters of the entire area appeared to be highly productive.

ENVIRONMENT SURVEY: Extensive biological and oceanographic observations were made throughout the cruise. Routine observations included oceanographic casts to depths of 500 or 1,000 meters, tow-net sampling with 1-meter, 2-meter, neuston, and enlarged Clark-Bumpus nets, night lighting, primary productivity, bathymetric, bathythermometric, and meteorological observations.

Note: See Commercial Fisheries Review, October 1965 p. 54.

United States Fisheries

EX-VESSEL VALUE OF CATCH SETS RECORD IN 1965:

The ex-vessel value of United States fishery products in 1965 reached a record high of about $440 million, up $51 million or 13 percent over 1964, Secretary of the Interior Stewart L. Udall announced. The 1965 record is also 11 percent above the previous record of $396 million in 1962.

The Director of the Interior's Bureau of Commercial Fisheries, informed the Secretary that the 1965 increase in value reflects a significant gain in demand for quality fish and fish products. The American consumer recognizes that fish is a relatively low-cost, high-protein food with little waste. The 1965 record reflects the continuing desirability of fishery products, adding that improvements in processing, packaging, freezing, and transportation all played parts in creating the record year.

For individual commodities, the shrimp industry led the parade of new records. The

Heading shrimp aboard a fishing vessel.

value of the United States shrimp catch in 1965 was estimated at $82.6 million, up 17 percent from 1964 and 8 percent above the previous record value of $70.4 million in 1953. Other fisheries that set new records in 1965 were northern lobsters, sea scallops, yellowtail flounder, haddock, Pacific halibut, and Alaska salmon.

U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, OCTOBER 1965:

During October 1965, a total of 54 vessels of 5 net tons and over was issued first documents as fishing craft as compared with 36 in October 1964. There were 30 documents cancelled for fishing vessels in October 1965 as compared with 39 in October 1964.

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, October 1965 with Comparisons

Area (Home Port)	Oct. 1965	Oct. 1964	Jan.-Oct. 1965	Jan.-Oct. 1964
	(Number)			
Issued first documents 2/:				
New England	2	3	32	29
Middle Atlantic	4	1	13	9
Chesapeake	4	9	38	36
South Atlantic	8	3	60	39
Gulf	27	11	253	194
Pacific	8	7	157	130
Great Lakes	1	1	2	2
Hawaii	-	-	-	1
Puerto Rico	-	1	1	2
Total	54	36	556	442
Removed from documentation 3/:				
New England	-	7	27	42
Middle Atlantic	2	5	17	24
Chesapeake	2	4	29	28
South Atlantic	10	12	74	49
Gulf	7	6	106	82
Pacific	9	5	80	127
Great Lakes	-	-	19	12
Hawaii	-	-	2	-
Puerto Rico	-	-	1	-
Total	30	39	355	364

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/There was 1 redocumented vessel in October 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 38 in 1965; 1 in 1960; 1 in 1954; 2 in 1951; 10 prior to 1949; and 2 unknown.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-29, 1966, amounted to 5,629,133 pounds (about 268,054 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 59 percent from the 3,540,035 pounds (about 168,573 standard cases) imported during January 1-30, 1965.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1966 at the 12½-percent rate of duty has not been announced; however, in 1965 the quota was 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota were dutiable at 25 percent ad valorem, but total imports were below the quota in 1965.

Virginia

INDUSTRIAL FISH INVESTIGATIONS COMMENCED:

Scientists at the Virginia Institute of Marine Science are undertaking a fishery research project that may add a new dimension to commercial fishing in Virginia, and to the associated fishery industries based there, according to its Director.

(Table continued in next column.)

The project concerns use of industrial fish, species ordinarily discarded in food-fish catches but which can be processed into high-protein meal or flour for domestic consumption.

According to the head of finfish research at the Institute and director of the industrial fish project, an estimated three-fourths of the species available in Chesapeake Bay and along the mid-Atlantic region of the continental shelf are among those which fishermen now discard.

Seventy five percent of the funds for the 3-year project will come from the Federal Government under the Commercial Fisheries Research and Development Act, Public Law 88-309, which provides up to 3 to 1 matching funds to states for worthwhile fishery research.

"If adequate state support is provided to match the Federal funds already approved, the program will continue for three years or longer," reported the director of the laboratory. "This long-range aspect will assure the accuracy of our data, upon which fishermen and manufacturers may consider large investments to develop what now appears an exciting economic potential."

The program's first expedition went to sea recently. Aboard the 90-ft. trawler Seabreeze, chartered from its Hampton, Virginia, owners for a month, were four Institute scientific personnel. They sampled for industrial fish along the continental shelf from Cape May to Cape Hatteras.

The marine biologists are primarily interested in two species of sea robins, three species of hakes, spiny dogfish, and other kinds of sharks and rays. Trawl samples will be made at 46 stations charted along the shelf in waters ranging from 30 to 100 fathoms. Sixty additional stations will be worked if time and weather permit.

The program's primary objective is to determine if species not now being taken occur in sufficient quantities to support an industrial fishery.

"We expect to sample the quantities and distribution of these fish in each season of the year," said the biologists. "When we have reached a certain stage in the program, manufacturers interested in developing the industry will have an idea of its potential."

Information gathered from the program may indicate that a new industry can be formed in Virginia, and close proximity to the raw product will favor its development.

Trawl fishermen already engaged in the seafood industry along Virginia's shores could receive additional income from this industry as it develops. They may return to port fully loaded with industrial species during seasons when food fishes are in short supply.

The month-long expedition will remain at sea for seven days each cruise, with two days in port for resupply and unloading of samples collected. The project now underway will ascertain the suitability of unused species to the industrial fishery, and it will determine the magnitude of supply and of sustained catch.

Washington

WIND RIVER CHINOOK SALMON FISHWAY IMPROVED:

The Engineering and Construction division of the Washington Department of Fisheries has completed improvements in the large fishway on the Wind River that bypasses Shipperd Falls on that Columbia tributary in Skamania County.

The improvements were installed to aid the escapement of fall chinook salmon past the falls. The run of chinook above the falls dates from 1955 and during the past few years substantial numbers of chinook have escaped to spawn in the upper river.

The fishway improvements include water intakes, piping and jet outlets to make the fishway more efficient and attractive to fall chinook salmon. A series of five surface and subsurface jet outlets were installed at the fish entrance. The increased water flow is continued in the first 3 bays of the fishway by water jets in diminishing proportions to lead the fish securely into the ladder. The water supply for these salmon attractions is brought through the fishway in a 30-inch pipe by siphon from an intake box near the upper end of the fishway.

The fishway was built in 1955 in an attempt to open up the stream for fall chinook utilization and to create an annual run. Since that time substantial numbers of fall chinook,

spring chinook, and coho or silver salmon have used the facility to reach the spawning grounds. Fall chinook escapements have totaled 4,173 in 1962; 1,916 in 1963; 2,391 in 1964; and 2,300 in 1965.

The returning salmon are adults from releases of young salmon in the river from the Federally operated Carson National salmon hatchery upstream from the fishway.

During the past two years, observation of the fishway had revealed that many adult fall chinook bypassed the entrance of the fishway and were trapped in the series of falls about half way up the ladder. To make the entrance of the fishway more attractive to salmon and to prevent their being trapped in the falls area, Washington Department of Fisheries engineers, working with biologists, designed the water jets to increase the flow at the entrance. Salmon are attracted by a vigorous horizontal current as well as an obvious flow of water. The jet outlets, placed just within and in front of the entrance, gives a strong flow at all water levels and by increasing the flow inside the first 3 bays in a diminishing proportion, it is believed that salmon entering the ladder will stay in it and completely bypass the falls.

In addition to the fishway improvements, some flood damage repair work was done down stream from the fishway entrance to make it easier for salmon to reach the entrance.

The fishway improvements were accomplished by the use of Federal funds, at a total cost of around $80,000. (State of Washington Department of Fisheries, December 17, 1965.)

Wholesale Prices

EDIBLE FISH AND SHELLFISH, FEBRUARY 1966:

The February 1966 wholesale price index for edible fish and shellfish (fresh, frozen, and canned) was at 123.2 percent of the 1957-59 average, a drop of only one percent from the previous month but 12.3 percent above February 1965. In spite of the small overall decrease from January, there was a mixed trend in the individual products with some sharp increases and decreases.

February 1966 prices for all items in the drawn, dressed, or whole finfish subgroup were down 10.6 percent from January due principally to a 41.7 percent drop in large fresh haddock prices at Boston. The haddock landings at that port increased sharply in February. There was practically no change in prices for halibut and salmon at New York City, while there were sharp increases in prices for the fresh-water items--whitefish at Chicago (up 15.9 percent) and yellow pike at New York (up 13.3 percent). The February index for this subgroup was 9.1 percent higher than the previous year.

Shucking oysters in a New Orleans oyster-shucking plant.

Fresh processed fish and shellfish prices were up slightly as an increase in prices for shucked oysters more than offset declines in prices for haddock fillets and fresh shrimp. However, the February index was 13.4 percent above the February 1965 index.

Prices for frozen flounder fillets and shrimp were up in February 1966, while prices for fillets of haddock and ocean perch were unchanged from January. The subgroup index for frozen processed fish and shellfish was 3.7 percent above the previous month and 6.8 percent higher than the previous year.

The only change in canned fish prices during February was an increase in pink salmon prices at Seattle. Tuna, mackerel, and Maine sardine prices were all unchanged from the

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, February 1966 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Feb. 1966	Jan. 1966	Feb. 1966	Jan. 1966	Dec. 1965	Feb. 1965
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					123.2	124.5	119.3	109.7
Fresh & Frozen Fishery Products:					124.9	127.7	120.6	114.5
Drawn, Dressed, or Whole Finfish:					123.7	138.3	123.4	115.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.14	.24	111.3	187.4	119.6	99.2
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.47	.48	139.0	141.0	141.0	117.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.88	122.3	122.3	122.3	113.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.63	108.2	93.3	93.3	96.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.85	.75	139.1	122.3	116.2	131.0
Processed, Fresh (Fish & Shellfish):					130.5	128.3	123.5	115.1
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.45	.44	109.3	105.7	105.7	105.6
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.05	.99	123.0	116.0	106.6	113.7
Oysters, shucked, standards	Norfolk	gal.	8.50	8.75	143.3	147.6	147.6	118.0
Processed, Frozen (Fish & Shellfish):					116.0	111.9	110.6	108.6
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.42	.40	106.4	101.4	101.4	88.7
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	117.3	115.8	115.8	114.3
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	112.2	112.2	112.2	108.7
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.98	.93	115.6	110.3	107.9	107.9
Canned Fishery Products:					120.7	119.3	117.5	101.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.00	124.2	122.0	119.8	91.5
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.63	12.50	112.1	111.0	108.8	102.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	128.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

previous month, and the overall index for the subgroup was up 1.2 percent. Compared with February 1965, all canned fishery products prices were much higher and the subgroup index was up 18.6 percent.

MOST ABUNDANT FISH ISN'T EATEN

Paradoxically, the most abundant fish along the Atlantic and Gulf Coasts never graces the dinner table. Menhaden, a boney fish too oily to eat, accounts for about 40 percent of the total catch of commercial fish and is the principal source in the United States for marine oils used as drying agents in paints and varnishes. The fish meal produced along with fish oils from menhaden is widely used in livestock and poultry feeds, and as a fertilizer.

International

FOREIGN FISHING OFF U. S. COASTS

SOVIET AND JAPANESE ACTIVITY, FEBRUARY 1966:

Alaska: U.S.S.R.: In mid-February 1966, a total of 145 Soviet vessels were fishing in the North Pacific Ocean, the Bering Sea, and the Gulf of Alaska.

A major Soviet Pacific ocean perch fleet of about 85 vessels fished in the eastern Gulf of Alaska. The vessels were deployed along the edge of the Continental Shelf from the Canadian border at Dixon Entrance to Middleton Island west of Cape St. Elias.

A small Soviet ocean perch fleet of about 20 vessels (some of which are large BMRT factory stern trawlers) was operating in the western Gulf of Alaska. The fleet was located along the 100-fathom curve in the vicinity south of Chirikof Island.

The Soviet shrimp fishery in the Gulf of Alaska consisted of two small fleets, each involving about five medium refrigerated trawlers (SRT-M class). One fleet was fishing east of the Shumagin Islands; the second was in the area between Chirikof and the Trinity Islands south of Kodiak Island. The Soviet 1966 catch quota for Bering Sea shrimp was set at 6,000 metric tons (13.2 million pounds).

On January 28, 1966, a U. S. Coast Guard plane sighted three Soviet vessels one-half mile inside U. S. territorial waters off Alaska. They were the large freezer stern trawlers Basargin (BMRT-343) and Khingan (BMRT-488), and the processing mothership Sovetskaia Kamchatka. Their position was 54°54' N. and 133°12' W., near Cordova Bay, Prince of Wales Island in Southern Central Alaska. All three vessels were underway and subsequent investigation disclosed that they left U. S. territorial waters. No action was taken by the Coast Guard or other U. S. authorities as it was believed that the Soviets had entered U. S. waters inadvertently.

JAPAN: Four factory stern trawlers were reportedly fishing on Albatross Bank in the western Gulf of Alaska east of the Trinity Islands. It was believed the vessels were fishing for Pacific ocean perch.

One factory stern trawler was reported fishing for ocean perch in the eastern Aleutians south of Unalaska Island.

Two factory stern trawlers were fishing in the Bering Sea north of Unalaska Island, predominantly for Pacific ocean perch.

A factoryship and 6 trawlers continued to operate in the Bering Sea along the eastern Aleutian Islands, taking mainly Alaska pollock (used for minced fish meat and reduction into fish meal and oil).

The vessels were joined by a second factoryship accompanied by 11 trawlers. According to Japanese press reports, that fleet was fishing primarily for Pacific ocean perch.

Northwest Pacific Coasts: U.S.S.R.: The Soviet fishing fleet that normally operates in the Gulf of Alaska moved massively south as far as Vancouver Island, British Columbia. By mid-February, almost 100 Soviet vessels (mostly medium side trawlers and large stern trawlers supported by refrigerated fish carriers) fished on the west side of Vancouver Island from Dixon Entrance to Queen Charlotte Sound. It seems that Soviet exploratory vessels which have been working off and on off the British Columbia's coast discovered large concentrations of ocean perch.

For a short while two Soviet large stern trawlers (Kazakhstan--BMRT-387 and Severomorski Komsomolets--BMRT-429) and a medium side trawler (SRTM--8410) fished 20-50 miles west of Cape Flattery, Wash. By mid-February, however, they had rejoined

International (Contd.):

the main Soviet fishing fleet off British Columbia.

A solitary Soviet refrigerated transport reported off Californian coast in mid-February 1966 was on a return journey to her home port of Vladivostok with frozen whale meat from the Soviet Antarctic Expedition.

Northwest Atlantic: U.S.S.R.: A total of 72 Soviet fishing vessels were sighted off the North Atlantic coast in mid-February 1966 of which 66 were identified as 36 factory stern trawlers, 4 processing and refrigerated freezer trawlers, 19 medium trawlers, 3 refrigerated transports, one processing and refrigerated factory base ship, one tanker, one tug and one hydrographic research vessel.

Of the 36 large factory stern trawlers, 7 fished southern Georges Bank. Heavy catches, (some trawls contained an estimated 30,000 to 40,000 pounds of fish) appeared to be mostly haddock mixed with small amounts of whiting.

The remaining Soviet vessels were concentrated in two large groups. The first, consisting of about 35 vessels, located 30-40 miles SSE. of Nantucket Island, was fishing mainly for whiting with incidental catches of red hake. The second group of fishing vessels, consisting of about 30 vessels and operating 60 miles SSE. of Block Island, also fished for whiting and red hake.

The U.S.S.R. hydrographic research vessel sighted does not normally operate with the fishing fleet as it does research for the Soviet Navy. However, it did refuel from a tanker operating with the fishing fleet.

In order to observe foreign fishing activity in the North Atlantic, the staff of the Fisheries Resource Management Office, Department of the Interior's Bureau of Commercial Fisheries, Gloucester, Mass., has been conducting reconnaissance flights cooperatively with the U. S. Coast Guard.

On January 20, 1966, a Soviet trawler (the Perekop, RT-221) requested permission from the U. S. Coast Guard to enter U. S. territorial waters for emergency repairs. The Perekop (with a cable fouled in the propeller of the vessel) was towed near Provincetown, Mass., by a Soviet salvage tug (the Steregushchii). A boarding party consisting of U. S. Coast Guard, Navy, Customs, and Bureau of Commercial Fisheries personnel went aboard. The boarding party had no interpreter.

Gulf of Mexico and Caribbean: JAPAN: It is thought that the Japanese are long-lining for tuna in this area. It is believed that approximately 20 vessels are so engaged delivering fish to St. Martin, Netherlands Antilles.

U.S.S.R.: In an article published in the St. Petersburg Times, Congressman Paul Rogers of Florida reported on his discussions with Soviet fishery scientists during his visit to the Soviet Union. The Soviets "admitted that they have an ocean research vessel operating in the Gulf of Mexico. The vessel shows Cuban fishing fleets where to fish."

According to a December 1965 article in World Fishing, the U.S.S.R. maintains at Havana 2 fishery research vessels. They engage in an extensive fishery research program which benefits the Cubans at present, but which may be used by the Soviets once the Havana fishing port is completed (July 1966). The Soviet Union also contributes the services of 10 fishery scientists who are stationed in Cuba.

Note: See Commercial Fisheries Review, Mar. 1966 p. 17 and p. 27. (Summaries of foreign fishing activity off U. S. coasts formerly were reported in the section of Commercial Fisheries Review on "Trends and Developments," usually under the subheadings: "Alaska" and "North Atlantic."

EUROPEAN FISHERY EXHIBITIONS

RECENT AND FUTURE FISHERY TRADE FAIRS:

In Europe, international fairs or exhibitions are a well accepted and successful means of publicizing and marketing industrial and food products. International fishery fairs have become a part of this picture in the last decade and are increasing in number.

Sales prospects by exhibitors at European fishery fairs are not limited to Western European countries since representatives of developed and developing countries in Asia and Africa usually are in attendance. East Bloc countries both attend and exhibit. Poland has exhibited its line of fishing vessels at international fisheries fairs for a number of years, and East Germany has begun exhibiting refrigerating and reduction machinery.

International (Contd.):

Recent Fishery Fairs: Following is a brief listing of recent European fishery exhibitions:

Exhibition	Attendance		Exhibitors	
	Persons	Countries	Individual Exhibitors	Countries Represented
	(Number)			
Third International Fishery Trade Fair--Goteborg, Sweden, Nov. 1965	1/	1/	186	10
Second Official Fisheries Fair--Trondheim, Norway, Aug. 19-29, 1965	78,000	1/	185	8
World Fishing Exhibition--London, England, May 27-June 2, 1965	2/20,000	1/	200	12
Fifth International Fisheries Trade Fair--Copenhagen, Denmark, Sept. 11-20, 1964	37,000	1/	200	14
World Fishing Exhibition--London, England, May 27-31, 1963	2/13,000	92	200	17
Fourth International Fisheries Trade Fair--Copenhagen, Denmark, April 14-23, 1962	55,000	39	230	14

1/Data not available.
2/Attendance was restricted to those with fishery interests--general public was excluded.

Future Fairs: Fishery exhibitions planned in the future include: (1) the Fisheries Fair, Ostende, Belgium, Mar. 19-27, 1966; (2) the Biennial International Exposition of Fishing, Lorient, France, May 12-22, 1966; (3) the 6th International Fisheries Trade Fair, Copenhagen, Denmark, May 12-21, 1967; (4) the World Fishing Exhibition, London, England, May-June 1967; and (5) the Third Official Fisheries Fair, Norway, 1970. (Regional Fisheries Attache, United States Embassy, Copenhagen, December 15, 1965.)

Note: See Commercial Fisheries Review, Nov. 1965 p. 69, Sept. 1965 p. 79, May 1965 p. 52, and Dec. 1964 p. 91.

FOOD AND AGRICULTURE ORGANIZATION

SOUTH AMERICA EXPORTS MORE FISH IN 1964:

The nations and territories of South America conducted international trade in fish and fish products totaling 1,777,000 metric tons worth US$208 million in 1964, according to the Food and Agriculture Organization of the United Nations.

South America's fishery imports were 72,000 tons worth $27 million. In 1963 the Continent's international fish exports amounted to 1,351,000 tons worth $154.5 million; imports were 67,000 tons worth $26.5 million.

The bulk of South America's international fish trade was Peru's 1,574,700 tons of exports, and the great majority of that was fish meal and oil for feeding animals, worth $167 million. Peru ranked third in the world, behind Japan and Canada, in fishery export earnings; it also imported 800 tons of fish worth $573,000.

Next in the South American group came Chile, with exports of 168,000 tons worth $22 million. Chile imported $62,000 worth of fishery products. Complete 1964 figures for Bolivia, Paraguay, and Venezuela were not available.

International fish trade figures for the other South American countries were:

Argentina--exported 3,400 tons worth $570,000 and imported 4,600 tons worth $1.4 million.

Brazil--exported 1,800 tons worth $2.8 million, imported 26,300 tons worth $14.6 million.

British Guiana--exported 3,100 tons worth $4.1 million, and imported 3,200 tons worth $1.5 million.

Colombia--exported 600 tons worth $1 million and imported 10,600 tons worth $1.8 million.

Ecuador--exported 8,100 tons worth $3.5 million and imported 200 tons worth $94,000.

French Guiana--exported 100 tons worth $89,000 and imported 200 tons worth $176,000.

Surinam--exported 800 tons worth $886,000 and imported 1,500 tons worth $700,000.

International (Contd.):

Uruguay--exported 800 tons worth $114,000 and imported 900 tons worth $533,000. (FAO, Bulletin of Fishery Statistics, No. 8, Fishery Commodities, 1964.)

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WORLD FISHERY TRADE IN 1964 ESTABLISHES RECORD:

International imports of fish and fish products reached a new high of US$1,963 million in 1964, the latest year for which statistics are available, according to the Food and Agriculture Organization (FAO) of the United Nations. Exports were valued at $1,739 million.

FAO warns, however, that its trade figures represent statistics forwarded to the organization by only 145 nations, about 88 percent of those engaged in commercial fishing. No trade figures were available for Mainland China.

About 41 percent of the 1964 record world fish catch of 51.6 million metric tons went into international trade in one form or another. The percentage for the 1963 world catch of 47.4 million tons was 37 percent.

The $1,963 million value of international fishery imports was $259 million above the total 1963 value of $1,704 million. Exports in 1964 were valued at $1,739 million, or $210 million more than in 1963.

The leading nation in fishery export earnings was Japan, selling abroad 573,000 tons of fish worth $248 million. Top fish importing nation was the United States, buying 976,000 tons worth $488 million.

The volume of international trade--on a live weight basis--in fish and fish products, as compared with the total world catch, has increased steadily since World War II. In 1948 it was 20 percent, compared with 27 percent in 1954; it topped 32 percent, or about one-third of the world catch in 1960.

Some 68 percent, or above 35 million metric tons, of the 1964 catch was used for human consumption and was marketed fresh, frozen, cured or canned. About 32 percent, or above 16 million metric tons, was used for reduction to fish meal or oils for feeding animals.

About one-third of the 1964 catch (17 million tons) was marketed fresh. Some 16 percent, or above 8 million tons, was sold cured--smoked, salted, dried, etc. Frozen fishery products accounted for almost 10 percent (about five million tons) and canned fish products for over 8 percent (4.4 million tons).

Canada, second to Japan, exported 351,000 tons worth $184 million. In third place came Peru, for the past three years the world's top fish-catching nation, with 1,575,000 tons of exports worth $166 million. Peru's exports are mostly fish meal.

Fourth came Norway with 462,000 tons worth $156 million. Denmark and her Faroe Islands ranked fifth, with exports of 388,000 tons worth $118 million.

The only other nation to earn above $100 million was Iceland, with 402,000 tons worth $101 million.

Other nations exporting more than $25 million worth of fish and fish products were: South Africa and Southwest Africa--401,000 tons worth $74 million; Netherlands--206,000 tons worth $57 million; United States--114,000 tons worth $56 million; Mexico--41,000 tons worth $51 million; U.S.S.R.--99,000 tons worth $44 million (estimated); Portugal--106,000 tons worth $49 million; Spain--77,000 tons worth $35 million; Morocco--87,000 tons worth $34 million; Federal Republic of Germany--81,000 tons worth $31 million; Sweden--242,000 tons worth $26 million; and United Kingdom--53,000 tons worth $26 million.

Second largest fish importer was the United Kingdom with 710,000 tons worth $275 million, followed by the Federal Republic of Germany, 796,000 tons worth $158 million; and France 320,000 tons worth $123 million.

Other Nations importing above $25 million worth were: Italy--258,000 tons worth $93 million; Japan--188,000 tons worth $70 million; Netherlands--299,000 tons worth $61 million; Belgium and Luxembourg--189,000 tons worth $53 million; Sweden--139,000 tons worth $49 million; Denmark and Faroe Islands--212,000 tons worth $33 million; Hong Kong--69,000 tons worth $32 million; U.S.S.R.--101,300 tons worth $28 million; Australia--46,700 tons worth $27 million; Switzerland--62,400 tons worth $26 million. (FAO Bulletin

International (Contd.):

of Fishery Statistics, No. 8, Fishery Commodities, 1964.)

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FOOD IRRADIATION SYMPOSIUM CALLED:

An International Symposium on Food Irradiation will convene June 6-10, 1966, in Karlsruhe, West Germany. It is sponsored by the International Atomic Energy Agency and the Food and Agriculture Organization. Purpose of the meeting is to review the present status of food irradiation and assess its potential. Fish and seafoods are included. (United States Embassy, Vienna, January 12, 1966.)

INTERNATIONAL PACIFIC HALIBUT COMMISSION

NORTH PACIFIC HALIBUT REGULATIONS FOR 1966:

Fishing for halibut will begin May 9, 1966, at 6 p.m. Pacific Standard Time in the most important North Pacific areas (Areas 1, 2, and 3A), eight days later than in 1965, according to the recommendations of the International Pacific Halibut Commission to the Governments of the United States and Canada for the 1966 fishing season. The proposed 1966 regulations contain important changes from 1965. Among them are new designations for former areas 3B North to 4A and 4B; 3B Northeast to 4C, 4E, and part of 4D; and 3B Northwest to 4D West of 175° W. longitude.

The openings and closings of the various regulatory areas will be 6 p.m. Pacific Standard Time in Areas 1, 2, 3A, and 3B. In all other areas the opening will be at 3 p.m. and the closing at 6 p.m. local time.

Fishing areas in 1966 shall be: Area 1--south of Willapa Bay, Washington; Area 2--between Willapa Bay and Cape Spencer, Alaska; Area 3A--between Cape Spencer and the Shumagin Islands; Area 3B--the Shumagin Islands to Atka Island, not including the Bering Sea; Area 3C--west of Atka Island, not including the Bering Sea; Area 4A--the Bering Sea edge, Unimak Pass to the Pribilof Islands; Area 4B--Fox Islands grounds, Bering Sea; Area 4C--between the Pribilof Islands and 175° W. longitude; Area 4D--east of 175° W. longitude and north of a line between St. Paul Island and Cape Newenham and waters of the Bering Sea west of 175° W. longitude; and Area 4E--the flats east of Area 4A and south of the Cape Newenham line.

In Area 1, the fishing season, without catch limit, shall end at the same time as that in Area 2. (In 1965 Area 1 was closed on September 15, the date on which Area 2 closed.)

In Area 2 the fishing season shall end when the catch limit of 23 million pounds has been reached or on October 15, whichever is earlier. (The limit is the same as in 1965 and is 2 million pounds less than the quota of 25 million pounds in 1964. The catch limit in Area 2 in 1965 was attained by September 15 when the season closed.)

In Area 3A the fishing season shall end when a catch limit of 33 million pounds is reached or on October 15, whichever is earlier. (The limit is 1 million pounds less than in 1965 when it was attained on August 26 and the season was closed.)

In Area 3B the fishing season opened first on April 18 for 10 days and again on May 9 and will close when the catch limit of 3.5 million pounds is reached (including the amount taken during the first season of 10 days) or on November 15, whichever is earlier. (In 1965 the closing date for approximately this same area--Area 3B south--was September 30 when the catch limit of 4 million pounds was attained.) In Area 3C the fishing season, without catch limit, opened on March 25 and will close on November 15.

In Area 4A the fishing season opened for 9 days commencing on April 6 and ending on April 15, without catch limit. In Area 4B the fishing season shall be open for 9 days beginning on September 1 and ending on September 10, without catch limit. In Area 4C and 4E the fishing season opened on March 25 for 87 days ending on June 20, without catch limit. In Area 4D the fishing season opened on March 25 and will close on November 15, without catch limit.

There shall be no retention of halibut caught incidentally to fishing for other species in any area closed to halibut fishing.

In 1966 the Commission will provide 10 days' notice of closure of Areas 1 and 2; and 18 days' notice of closure of Area 3A; and at least 18 days' notice of closure of Area 3B.

The Commission's recommendations for the 1966 season were announced on February 4 at the conclusion of its 42nd annual meeting at Seattle, Wash., with Chairman William M. Sprules of Ottawa, Ontario, Canada, presiding.

International (Contd.):

The Halibut Commission, under authority of a Convention between the United States and Canada, investigates and regulates the halibut fishery of the northern Pacific Ocean and Bering Sea. Its function is the development of the halibut stocks to levels that will permit the maximum sustained yield. Its decisions regarding regulation of the fishery are required to be based on scientific findings.

A public session was held on February 1 at which time the 1965 fishery and the research conducted by the scientific staff were reviewed. On February 3, a meeting was held with the Conference Board, which consists of representatives of fishermen's unions and vessel owners, and with representatives of dealer organizations, at which time the Commission received various industry proposals for regulation of the fishery in 1966.

During executive sessions, the Commission dealt with administrative matters and approved a research program for 1966 continuing the 1965 program of tagging and assessment of the possible effects that foreign fishing may have upon the halibut stocks.

The Commission announced that the 1967 annual meeting will be held in Seattle, Wash. The date was not specified. Haakon M. Selvar of Seattle, Wash., was elected chairman, and Dr. William M. Sprules, vice chairman for the ensuing year.

Since in the past the United States and Canadian Governments have accepted the recommendations of the Commission without change, it is assumed that the 1966 regulations will likewise be approved as recommended.

Note: See Commercial Fisheries Review, April 1965 p. 43.

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

REGULATIONS FOR 1966 SOCKEYE AND PINK SALMON IN NORTH PACIFIC:

The tentative regulatory recommendations for control of the 1966 sockeye and pink salmon fishery in North Pacific Convention waters as submitted to the fishing industry on December 17, 1965, were reconsidered on the basis of suggestions made by the Advisory Committee at a meeting of the International Pacific Salmon Fisheries Commission on January 14, 1966.

Action taken by the Commission in view of the Committee's representations:

1. The closure to all net fishing in both Canadian and United States Convention waters lying westerly of the Angeles Point-William Head line originally recommended to be "June 26 to August 6" was changed to read "June 26 to July 30."

2. No change was made in the previously established policy of the Commission on opening and closing hours for fishing in any of the Convention waters. If found to be practical on the basis of further study, consideration will be given during the fishing season regarding the weekly opening date in Canadian Convention waters to prevent movement of large numbers of gill-net boats from one fishing area to another.

3. In the Point Roberts area of United States Convention waters the Lily Point closure line was made effective for one week only commencing September 4 instead of the originally recommended two-week period commencing on the same date. The Iwersen dock line will be in effect from September 11 to October 1.

4. The Commission agreed that the conservation of sockeye would not be impaired by the use of spring salmon nets during the June 26-July 9 closure in United States Convention waters lying easterly of Angeles Point.

In finalizing its regulatory recommendations for the 1966 season the Commission emphasizes that there will be a need as in past years for adjusting fishing time during the season to provide for variation in the expected number of fishing boats, to meet individual racial escapement requirements, to reach parity in the catch by each country, and to allow adequate harvest of each major run. Notice of each regulatory change made during the fishing season will be given as far in advance as possible.

CANADIAN CONVENTION WATERS:

Area 20:

June 26 to July 30	- Closed to all net fishing.
July 31 to September 3	- Purse seines open daily 6:00 a.m. to 6:00 p.m. Monday and Tuesday of each week.
	- Gill nets open daily 6:00 p.m. to 6:00 a.m. Monday afternoon to Wednesday morning of each week.
September 4 to September 10	- Purse seines open daily 7:00 a.m. to 7:00 p.m. Monday and Tuesday.
	- Gill nets open daily 7:00 p.m. to 7:00 a.m. Monday afternoon to Wednesday morning.
September 11	- Relinquish control.

International (Contd.):

Areas 17, 18, 19 and District No. I:

June 26 to August 6	- Open 8:00 a.m. Monday to 8:00 a.m. Wednesday of each week.
August 7 to August 20	- Open 8:00 a.m. Monday to 8:00 a.m. Tuesday of each week.
August 21 to September 3	- Open 8:00 a.m. Monday to 8:00 a.m. Tuesday of each week only in those waters of District No. I lying easterly of the Brunswick Cannery-Oak Street Bridge boundary.
September 4 to September 10	- Open 8:00 a.m. Monday to 8:00 a.m. Tuesday.
September 11 to September 17	- Open 8:00 a.m. Monday to 8:00 a.m. Tuesday only in those waters of District No. I lying easterly of the Brunswick Cannery-Oak Street Bridge boundary.
September 18 to September 24	- Closed to all net fishing.
September 25 to October 8	- Open 8:00 a.m. Monday to 8:00 a.m. Tuesday of each week.
October 9	- Relinquish control.

Special Troll Restrictions:

Fishing for sockeye or pink salmon other than by angling or trolling for the purpose of personal consumption and not for sale or barter shall be prohibited in these Convention waters of Canada (the waters of Howe Sound excepted), lying easterly and inside of a straight line projected from Gower Point at the westerly entrance to Howe Sound to Thrasher Rock light, thence in a straight line to Salamanca Point on the southerly end of Galiano Island, thence in a straight line to East Point on Saturna Island, thence in a straight line towards Point Roberts light to the intersection with the international boundary line, thence following the international boundary line to its intersection with the mainland from the 21st day of August to the 8th day of October, both dates inclusive, except at the times that net fishing other than with spring salmon nets may be permitted within that area.

UNITED STATES CONVENTION WATERS:

West of Angeles Point-William Head line and East of Bonilla-Tatoosh line:

June 26 to July 30	- Closed to all net fishing.
July 31 to August 6	- Gill nets open daily 7:00 p.m. to 9:00 a.m. Monday afternoon to Wednesday morning.
	- Purse seines open daily 5:00 a.m. to 9:00 p.m. Monday and Tuesday.
August 7 to September 10	- Gill nets open daily 7:00 p.m. to 9:00 a.m. Sunday afternoon to Tuesday morning of each week.
	- Purse seines open daily 5:00 a.m. to 9:00 p.m. Monday and Tuesday of each week.
September 11	- Relinquish control.

East of Angeles Point-William Head line:

June 26 to July 9	- Closed to all net fishing except with nets having a mesh of not less than 8½ inches extension measure and under regulation by the Washington State Director of Fisheries.
July 10 to August 6	- Gill nets open daily 7:00 p.m. to 9:00 a.m. Monday afternoon to Wednesday morning of each week.
	- Purse seines and reef nets open daily 5:00 a.m. to 9:00 p.m. Monday and Tuesday of each week.
August 7 to October 1	- Gill nets open daily 7:00 p.m. to 9:00 a.m. Sunday afternoon to Tuesday morning of each week.
	- Purse seines and reef nets open daily 5:00 a.m. to 9:00 p.m. Monday and Tuesday of each week.
September 4 to September 10	- Waters lying westerly of a straight line projected true south from Lily Point to the intersection with the international boundary line will be closed to all net fishing.
September 11 to October 1	- Waters lying northerly and westerly of a line from Iwersen's dock on Point Roberts to Georgina light at Active Pass will be closed to all net fishing.
October 2	- Relinquish control.

Notes: (1) Times are based on Pacific Daylight Saving Time.
(2) See Commercial Fisheries Review, April 1965 p. 45.

International (Contd.):

LAW OF THE SEA

CONVENTION ON FISHING AND CONSERVATION OF THE LIVING RESOURCES OF THE HIGH SEAS RATIFIED BY MEXICO:

On December 20, 1965, Mexico became the 21st country to ratify the Convention on Fishing and Conservation of the Living Resources of the High Seas. Twenty-two ratifications or accessions are needed for the Convention to enter into force.

The Convention has provisions which for the first time recognize the special interests of the coastal nations in maintaining the productivity of the high-seas resources adjacent to their territorial sea. On the other hand, the Convention sets forth standards which should discourage irresponsible action by coastal states seeking to extend their jurisdiction under the guise of conservation. This Convention is one of the four adopted at Geneva, April 29, 1958, by the United Nations Conference on the Law of the Sea. The other three Conventions (the Territorial Sea and the Contiguous Zone, the High Seas, and the Continental Shelf) have entered into force. Those Conventions were also ratified by Mexico on December 20, 1965.

NORTHWEST PACIFIC FISHERIES COMMISSION

MEETING, FEB. 25-MAR. 25, 1966:

The International Northwest Pacific Fisheries Commission (Soviet Union and Japan) met in the Soviet Union, February 25-March 25, 1966. This year's meeting, originally scheduled to open on March 1, was moved up to avoid overlap with the Soviet Communist Party Congress scheduled to open in Moscow on March 25. The Commission sets the annual Soviet and Japanese catch quotas for salmon, herring, and crabs in the Northwest Pacific Ocean.

The pact between the two countries, originally entered into in 1956, is due to expire at the end of 1966. The Japanese were concerned that the Soviets wished to discuss at this meeting, in addition to the catch quotas, the revision of the treaty and the Convention. To this the Japanese objected. They favored talks on treaty revision to be held separately from those held to set catch quotas.

The agenda proposed by the Soviet Union for the meeting did not, as has been the usual practice, include a suggested date for the 1967 meeting. This has led to the belief in Japan that the Soviets intended to tie-in discussions on treaty revision with the quota negotiations. At this year's meeting the Soviets were expected to make a strong demand for a drastic cut in the Japanese salmon catch.

At any discussions on revision of the treaty the Japanese expected to raise a number of points which they consider especially disadvantageous to themselves. Some of these points are: (1) since the treaty covers only fishing operations on the high seas, the catch quotas affect only the Japanese; (2) restrictions are imposed not only on the Japanese catch but also on fishing areas, vessels, and gear; (3) the Commission's authority is too broad. (Various Japanese press items.)

Argentina

GOVERNMENT REQUESTS JAPANESE HELP IN MAKING FISHERY MARKETING SURVEY:

Argentina approached Japanese fishery officials in January 1966 and requested that a Japanese fishery team undertake a marketing survey in Argentina. The survey would be aimed at supporting Argentina's policy of developing a strong export trade in fishery products. (Suisancho Nippo, January 20, 1966.)

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JAPANESE-ARGENTINE JOINT FIRM PLANS TO PROCESS AGAR-AGAR:

A Japanese industrial firm and an Argentine firm are reported to be planning to establish a joint agar-agar processing company in Chubut Province in southwest Argentina in May or June 1966. The Japanese firm is to contribute 49 percent and the Argentine firm 51 percent of the total capital investment. In addition to manufacturing agar-agar, the joint company is expected to export to Japan seaweed harvested along the Argentine Bay of Bustamante. The Japanese Government was expected to give approval for the joint venture in Argentina. (Suisan Keizai Shimbun, December 24, 1965.)

Barbados

STATUS OF TUNA FISHERY, 1965:

Fishing for tuna and tuna-like species is carried out all year round within a radius of 35 miles around the island of Barbados. The principal method of fishing for this species is by trolling and drift fishing with lines--mainly single hook using live bait. The entire fishing fleet of over 400 vessels indulges in this fishery. The local type fishing vessel is 20-30 feet overall length and powered by 10-35 horsepower inboard diesel engines. No program for constructing tuna vessels is envisaged. The catch is sold fresh or placed in cold storage.

No biological or technological research is being conducted on tuna by Government or other installations. (United States Consulate General, Barbados, February 3, 1966.)

Canada

NEW HERRING REDUCTION PLANT FOR EAST COAST:

Plans for a new herring reduction plant in New Brunswick with a potential processing capacity of 15 short tons of herring an hour or 360 tons a day were announced in December 1965 by the New Brunswick Fisheries Minister. The new East Coast plant is to be set up in Lower Caraquet, New Brunswick, by a British Columbia firm and may be in operation by April 1966. The scale of initial operations will depend on the availability of herring.

At present, New Brunswick is using only about 4 percent of the potential herring harvest in the Gulf of St. Lawrence, according to some biologists. The new plant could extend the herring fishing season and create a market for herring on a continuing basis. New Brunswick fishermen now catch herring close to shore in the spring and fall with conventional gill nets. To test fishing farther offshore, the New Brunswick Department of Fisheries plans to charter the 80-foot steel herring seiner Quoddy Bay which can follow the herring migration when the fish move out to deep water in the summer. Other large herring vessels may operate in the area if the purse-seining by the Quoddy Bay proves successful. (Canadian Fisherman, January 1966, and other sources.)

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FEDERAL-PROVINCIAL DEVELOPMENT PROGRAM FOR FISHERIES IN NEWFOUNDLAND AND LABRADOR:

A substantial program for joint fisheries development projects in 1966 was announced January 19, 1966, by the Canadian Federal Fisheries Minister and the Newfoundland Minister of Fisheries.

The program, which is being carried out by the Newfoundland Fisheries Development Authority and the Industrial Development Service of the Federal Department of Fisheries, will be directed to a variety of operations to speed up the fisheries development of Newfoundland and Labrador. The projects it provides for will involve (1) the construction of a number of combination-type vessels, (2) demonstration of new and improved gear and equipment, and (3) the introduction of fishery techniques not presently used in Newfoundland. Several technical specialists will be made available to provide fishermen with the know-how essential to more efficient operations.

One of the most important projects is the development of a type of multipurpose fishing vessel on which a start was made in 1965. This is part of a program to introduce more efficient vessels to the Newfoundland fleet. The new vessels will be used for experimentation and demonstration on inshore and near-offshore grounds. They will make diversified operations possible by using the same vessels for dragging, seining, long-lining, gill-netting, and other methods. With larger and more mobile vessels, operators should be able to catch fish throughout most of the year, over an extended area, and utilize more species.

In announcing the new program, the Ministers stated that some projects will be carried out on a 50-50 basis, while for others, the Federal Government will meet 75 percent of the cost and the Provincial Government 25 percent, depending upon the nature of the undertaking. In several projects there will also be financial participation by the fishing industry. Technical assistance will be provided at Federal cost, and on an increasing scale, with specialists drawn not only from Newfoundland but from other areas of Canada and countries such as the United States, Great Britain, Norway, and Japan.

In describing some of the projects for 1966, the joint statement said that last year a survey was made by Scottish fishing skippers to

Canada (Contd.):

see if it would be feasible to introduce to the Newfoundland fisheries the Scottish version of seine netting for cod and other groundfish. This year some local Newfoundland vessels will be converted to Scottish seine netting. The Federal Department of Fisheries is trying to charter a Scottish seine-net vessel with its regular crew to demonstrate the method in Newfoundland.

There will be an exploratory fishing program in areas which hold promise for shrimp, since it is felt that this species could provide a profitable operation for many fishermen.

Squid fishery activities are to be expanded in 1966. Tremendous schools of squid move into the shallow waters off Newfoundland in the summer, but the traditional fishing season is relatively short, and from time to time the squid fail to show up, with resulting distress to fishermen. Squid are not only an export item but are the cod fishermen's first choice for bait. This year's squid project will lay emphasis on the catching of squid in deeper waters, and if successful will result in a longer squid season.

Snap-gear long-lining, a method used successfully on the Pacific Coast, is also to be introduced to Newfoundland. This gear is more versatile, more easily set and hauled, and more easily maintained than the long lines now in use in the Atlantic.

The Ministers also referred to the herring fishery, stating that it will play an ever-increasing role in the development of Canada's Atlantic fisheries. With large stocks of herring available and a growing market for that fish, not only for meal and oil but also for human consumption, a determined effort is being made to establish a pattern for year-round exploitation.

The introduction of synthetic materials in the making of cod traps is a project of interest to Newfoundland fishermen. The Icelandic method of cod seining is another. On-the-spot studies of this method were made last year and it is thought that it could have application to the Newfoundland cod fishery.

The Federal and Provincial governments, in cooperation with Memorial University, have completed a survey of the Labrador fishery in order to determine the best approach to its commercial development. Although the full report is not yet available, provision has been made for this historically important fishing area to benefit from the current program. (Canadian Department of Fisheries, Ottawa, January 19, 1966.)

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BRITISH COLUMBIA LANDINGS, 1965:

A record silver salmon catch of 36.7 million pounds and a top price of 40 cents a pound for halibut highlighted the annual 1965 British Columbia catch statistics issued by the Canadian Department of Fisheries in Vancouver, B. C. The total ex-vessel value of all fish landings for the Province in 1965 totaled C$47.4 million down $900,000 from 1964.

Salmon landings were down sharply, totaling 95 million pounds. That was second only to the alltime low of 1960. The British Columbia salmon pack for 1965 amounted to 913,000 cases compared to 1,255,000 cases in 1964.

In spite of the overall low level of salmon landings, British Columbia fishermen took a record high silver salmon catch of 36.7 million pounds worth C$11.1 million ex-vessel. The previous high was in 1951 when fishermen landed 35.2 million pounds.

The total landings of sockeye in 1965 were 16.2 million pounds worth C$6 million; in 1964 they were 23 million pounds valued at C$8.3 million.

The catch of king salmon in 1965 was 12.7 million pounds valued at C$5.3 million.

For pink salmon, the total production was 23 million pounds worth C$2.7 million as compared to the cycle year of 1963 which produced 60.1 million pounds worth C$6.1 million.

The total production of chum salmon in 1965 was the lowest of any year on record, totaling only 6.7 million pounds worth C$824,000. The previous low was in 1961 when fishermen brought in 14.6 million pounds. The total ex-vessel value of all salmon landed in the Province was C$26 million in 1965 as compared to C$30.2 million in 1964. In spite of the overall drop in salmon production in 1965, the trollers had an alltime record year because of the record silver catch.

The landings of halibut increased sharply during 1965 and coupled with record high prices,

Canada (Contd.):

yielded alltime high ex-vessel returns C$11.1 million. The average price during the season was 33.7 cents a pound with the high reaching 40 cents a pound at both Prince Rupert and Vancouver. British Columbia fishermen landed 33 million pounds of halibut at both Canadian and United States ports.

The value of herring increased slightly during 1965 because of higher prices to the fishermen. Total herring production during 1965 was 222,000 short tons with a value of C$6.23 million as compared to 252,000 tons in 1964 worth C$6.17 million.

For other species, the highlight was landings of grey cod, totaling 19.2 million pounds worth C$1.1 million as compared to 12 million pounds in 1964 worth C$720,000.

Crab production was down, totaling 3.5 million pounds in 1965 worth C$552,000 as compared to 4.35 million pounds worth C$699,000 in 1964.

The production of oysters showed a slight drop, totaling 151,000 shucked U. S. gallons worth C$612,000 as compared to 154,000 shucked U. S. gallons worth C$588,000 in 1964.

The production of shrimp was up sharply although still not a record year, with a volume of 1.76 million pounds, worth C$281,000 as compared to 1.05 million pounds worth C$161,000 in 1964. (Canadian Department of Fisheries, Vancouver, January 28, 1966.)

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NEW LICENSING SYSTEM FOR BRITISH COLUMBIA FISHERMEN AND VESSELS:

Details of a new system of licensing fishermen and fishing vessels on the Pacific coast were announced January 25, 1966, by the Canadian Minister of Fisheries. The new system went into effect April 1, 1966.

Under the new system, a personal fishing license costing C$5 annually will be required for all wishing to engage in commercial fishing operations in British Columbia. The license is available from any office of the Department of Fisheries in British Columbia.

In addition, all vessels engaged in any commercial fishing operation are to be registered at Pacific Area headquarters of the Department of Fisheries of Canada in Vancouver. The annual cost of registration is C$10 and commercial fishing license plates will be issued. Applications for vessel registration are to be available from all Fisheries offices in the Province.

Any vessel participating in the salmon fishery will be required to obtain an additional license for which a fee of C$5 will be charged in 1966. This year, the salmon license fee will not be based on the size of a vessel as proposed earlier. A meeting of Canadian Federal officials with representatives of British Columbia's fishing industry was scheduled in February 1966 to consider further steps which may be taken to control fishing effort in the salmon fishery. (Canadian Department of Fisheries, January 25, 1966.)

Chile

FISH MEAL INDUSTRY, 1965, AND FUTURE PROSPECTS:

By all accounts 1965 was a disastrous year for the fish meal industry in northern Chile. With the return of the anchovy to the northern coast in the second week of December, however, the prolonged period of resource famine (extending more than 20 months) showed promise of ending. Preliminary figures for December show a catch of 94,000 tons--the highest for any month since February 1964--which was accomplished despite strikes (which kept most vessels idled until December 8 and 16 in Iquique and Arica respectively), the year-end holidays, and a reduced operational fleet (due to lack of maintenance during the months the purse seiners remained in port). The December catch raises the total for the year to about 415,000 tons (the lowest annual figure since 1961) but more importantly offers new hope for a return to normalcy in the new year. Some observers are predicting that Chile will export 150,000 tons of fish meal in 1966.

The extent to which the fish return and to which the industry responds to the opportunity thus presented will also be significant factors affecting the future control and operation of the industry. During the past year, Chile's Corporación de Fomento de la Producción (CORFO), a Government planning agency, has

Chile (Contd.):

come under increasing pressures from many directions to institute a comprehensive program to rationalize the industry and revitalize the economy which it largely supports. Through October CORFO measures were directed principally at curtailing expansion of the fish meal industry and sustaining a minimum level of economic activity through various ad hoc measures (e.g. loans, public works projects). Additionally, a new fisheries bill, designed to provide payment in part of export bonuses in arrears and to ease plant mergers and moves was introduced in the Congress. This bill was approved in early 1966 by the Lower House and was passed on to the Senate.

As it became increasingly evident that the fish were not returning, pressures on CORFO to take stronger action grew more intense, and at the year's end, the Development Corporation announced that plans had been concluded to reorganize and restructure several of the plants (especially in Iquique) with increased financial assistance from CORFO accompanied by direct Government participation in both ownership and management.

The lessons so clearly imparted during the prolonged resource shortage were: (a) the Chilean fish meal industry was overexpanded, overconcentrated, and overspecialized; and (b) an export-oriented industry must operate efficiently if it is to meet competition in the world market. Additionally, the period of hardship demonstrated that some plants were able to rationalize operations beyond prior expectations. (United States Embassy, Santiago, January 26, 1966.)

Cuba

HAVANA FISHING PORT TO OPEN SOON:

Havana fishing port will be finished on or about July 26, 1966, to celebrate the Cuban revolutionary holiday, according to Cuban sources. Built at a cost of 30 million pesos (US$30 million), the Havana port will accommodate 130 medium (250-600 gross tons) Cuban and Soviet fishing vessels.

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CUBAN FISHING VESSEL UNDER SOVIET MASTER:

The 60-gross-ton Cuban fishing vessel Perca F-0-7006 arrived at Progreso (Yucatan Peninsula, Mexico) to put ashore a sick Cuban crewman. The crewman was transferred to the Perca from his own vessel, the Victoria I, at Isla Mujeres.

The Master of the Perca is a Russian national; however, the First Officer and Chief Engineer are Cuban nationals. The Perca carries a crew of 31. (U. S. Consulate, Merida, December 17, 1965.)

Editor's Note: The Victoria class of vessels is being built in Victoria de Giron Shipyards at Cardenas. Six of these 180-gross-ton vessels, the largest of domestically-built Cuban fishing vessels, are being constructed.

Denmark

FISH MEAL, OIL, AND SOLUBLES PRODUCTION, 1964-1965; EXPORT TRENDS, DECEMBER 1965:

In 1965, Denmark produced 114,297 metric tons of fish meal, 40,364 tons of fish oil, and 16,774 tons of fish solubles. In 1964, output was 113,391 tons of fish meal, 34,772 tons of fish oil, and 11,841 tons of fish solubles.

In December 1965, Denmark exported 5,063 tons of fish meal including 4,615 tons of herring meal and 448 tons of other fish meal. The leading buyers were the United Kingdom with 1,414 tons, Hungary with 680 tons, Spain with 580 tons, and Poland with 500 tons. Most of the remainder went to West Germany, Switzerland, Sweden, and the Netherlands. Danish exports of fish solubles in December 1965 totaled 1,468 tons, almost all of which went to West Germany. (Regional Fisheries Attache, United States Embassy, Copenhagen, February 4, 1966.)

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MINIMUM POND TROUT PRICES ASKED:

In late 1965, it was thought that Danish pond trout prices might be stabilized after a lengthy, declining, and erratic market if the Danish Fisheries Ministry could establish and police minimum export prices as requested by the Danish trout producers and exporters. Nearly all of Denmark's 20-million-pound annual production of pond trout is exported.

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Denmark (Contd.):

EEL STUDIES IN THE SARGASSO SEA:

Eel eggs and sexually mature spawning eels are to be sought in the Sargasso Sea (between Bermuda and Puerto Rico) by Danish scientists during a 4-months expedition which left Copenhagen on the research vessel Dana, January 4, 1966. A Danish scientist found eel larvae there in 1913, but neither eggs nor mature eels were ever discovered in the area. Danish biologists believe European eels stop eating and swim 2,500-3,000 miles to the Sargasso Sea to spawn. Since experiments have indicated that eels spawn at about 68° F., the search will begin at the depth where that temperature occurs. Pelagic trawls, echo-sounders, ASDIC, and other sophisticated equipment will be used.

Other scientists aboard will sample water for radioactivity and measure the depth to which sunlight penetrates in the great deeps.

El Salvador

FOREIGN FISHING VESSELS PERMITTED TO ENTER EL SALVADOR PORTS:

Foreign fishing vessels are permitted to enter El Salvador ports if necessary due to adverse weather conditions, according to an official in the Fisheries Section of the Ministry of Economy. Permission to offload catch would be handled on a case by case basis similar to treatment permitted by U. S. Bureau of Customs regulations. (U. S. Embassy, San Salvador, February 4, 1966.)

Faroe Islands

LANDINGS AND EXPORTS AT RECORD LEVEL IN 1965:

In 1965 Faroese fishermen landed 144,000 metric tons of fish, surpassing 1962's record total by 500 tons. Faroese exports of fishery products reached a new record value of 172 million kroner (about US$24,940,000). Salted cod and herring prices were higher and fillet production about doubled. A Faroese vessel caught 40 tons of Atlantic salmon off West Greenland in gill nets. Faroese purse seiners landed North Sea herring in Denmark. The average daily income of fishermen on vessels increased about 25 percent from 1964 levels to $9.57.

India

STANDARDS FOR SHRIMP EXPORTS:

Compulsory quality controls of frozen and canned shrimp for export have been introduced by the Indian Government.

India's new shrimp standards are part of a larger inspection system covering other exports and is under the control of the Central Ministry of Commerce (Export Act). It is directed by the Central Institute of Fisheries Technology.

Before putting the quality control program into effect, a great deal of investigation and research was carried out. Health authorities in interested importing countries were consulted as to their requirements. Standards of quality and packaging were set up. A careful system of tests and methods of sampling were devised.

The quality control program began functioning on a voluntary basis in 1964 with participation by most of the major elements of the industry. After a trial period in which various problems of operation were solved, the Central Government of India declared the program compulsory early in 1965.

Before making a shipment, a packer must notify the Institute at least 12 hours before loading. The laboratory sends trained samplers to the warehouse where random samples are drawn based on the size of the proposed shipment.

Packers are required to code-mark all export production so a careful check can be made on all lots sampled. Samples are taken to the nearest laboratory of the Institute, where the testing is carried out.

Tests are always on an organoleptic basis and conform to the requirements of the Indian Standards.

If it appears necessary, or is requested by the packer, bacteriological tests are carried out. After the tests are completed and approved, an Inspection Certificate giving the pertinent details is issued and must be submitted to the

India (Contd.):

Indian Customs before export shipment can be made.

The rapidly expanding shrimp industry of the west coast of India, numbering over 30 plants, is lending full support to the quality-control program, realizing that a reputation for a high-grade product cannot help but improve markets and export earnings. (Fish Trades Review, December 1965.)

Israel

TUNA FISHING ACTIVITY IN THE ATLANTIC:

Israel has one 500-ton tuna vessel operating in the Atlantic. Fishing in southern waters with long-line gear, the vessel lands 600-800 tons of tuna annually in South Africa where it is transshipped to Israel. The catch averages from 50 to 75 percent yellowfin, from 20 to 40 percent bluefin tuna, and about 10 percent big-eyed. (United States Embassy, Tel Aviv, January 19, 1966.)

Japan

FROZEN TUNA MARKET PRICE HIGH IN JANUARY 1966:

The export price of Japanese frozen albacore tuna continued to rise and reached a new high in January 1966 of $450 a short ton delivered to Puerto Rico and $460 per ton c.i.f. delivered to California. In November 1965 U. S. buyers had been offering $425 a ton c.i.f. for that same species.

Dressed yellowfin tuna deliveries to Italy in January 1966 were quoted at a high of US$525-530 a metric ton c.&f. as compared with $490-495 a ton in mid-December 1965. Frozen round albacore tuna exported to that country was quoted at $500 a metric ton c.&f., or about $25 a ton below the yellowfin price.

The ex-vessel albacore tuna price in Japan as of mid-January 1966 was reported to be 155-160 yen a kilogram ($391-403 a short ton).

The Japanese trade was speculating as to the future trend and it was generally believed that the frozen albacore price would rise to $500 delivered to California. This was based on the U. S. canners' requirements for more raw material to meet the demand for the Lenten period, February 23 through April 8, 1966. Some Japanese believed that U. S. canners, especially "private label" packers, might not purchase additional albacore and that the price would level off. However, most Japanese traders felt that the demand would be so strong as to force the price to continue up, expecially since a price increase had been noted in the price of the canned product in the United States. (Suisan Tsushin, January 10, 1966, Katsuo-Maguro Tsushin, January 14, 1966, and other sources.)

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FROZEN TUNA EXPORTS TO U. S. AND PUERTO RICO, NOVEMBER 1965:

Japan's exports of frozen tuna to the United States and Puerto Rico in November 1965 were down markedly as compared with exports in the month of October. There was a drop of 58 percent in quantity and 65 percent in value.

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, Nov. 1965 and Oct. 1965

Species	November		October	
	Qty.	Value	Qty.	Value
	Short Tons	US$ 1,000	Short Tons	US$ 1,000
Albacore:				
United States ..	539	175	2,593	905
Puerto Rico ...	1,096	351	2,734	893
Total.....	1,635	526	5,327	1,798
Yellowfin:				
United States ..	290	94	1,587	566
Puerto Rico ...	135	28	750	218
Total.....	425	122	2,337	784
Big-eyed:				
United States ..	-	-	9	2
Puerto Rico ...	-	-	34	7
Total.....	-	-	43	9
Skipjack:				
United States...	-	-	-	-
Puerto Rico ...	1,127	156	-	-
Total.....	1,127	156	-	-
Other:				
United States ..	-	-	-	-
Puerto Rico ...	73	15	-	-
Total.....	73	15	-	-
Total United States	829	269	4,189	1,473
Total Puerto Rico	2,431	550	3,518	1,118
Grand total.....	3,260	819	7,707	2,591

Source: Japan's Bureau of Customs.

Japan (Contd.):

Shipments of skipjack and "other tuna" to Puerto Rico were made for the first time in several months. (Fisheries Attache, United States Embassy, Tokyo, January 19, 1966.)

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CANNED TUNA IN BRINE EXPORT MARKET, JANUARY-FEBRUARY 1966:

February 1966: The Japanese Government (as a result of the failure of tuna packers and exporters to renegotiate a new export agreement) extended by 1 month, to February 28, 1966, the 2-month interim export validation procedure instituted by the Government in December 1965 to permit canned tuna in brine exports to the United States, pending conclusion of a new export agreement. The Government's action was based on the provisions of the Trade Control Ordinance, which permits it to invoke an interim export validation procedure in the absence of an exporters' agreement.

Japanese Canned Tuna in Brine Export Prices (f.o.b. Japan), February 1966

Type of Tuna Pack	New Price	Increase Over Jan. Price	Increase Over Nov. 1965 Price
Can & Case Size:	(US$/Case)		
Whitemeat:			
7-oz. 48's	10.50	0.30	1.60
13-oz. 24's	9.70	0.30	1.50
4-lb. 6's	10.90	0.35	1.10
Lightmeat:			
7-oz. 48's	8.95	0.30	1.80
13-oz. 24's	8.60	0.25	1.95
4-lb. 6's	9.45	0.40	1.00

For February, the Government authorized for export to the United States a total of 300,000 cases of canned tuna in brine, of which 210,000 cases were allocated to exporters as merit quota (based on past performance) and 90,000 cases as adjustment quota. At the same time, the Japan Canned Tuna Sales Company, which handles sales to exporters, announced the third increase in export prices since December 1965, ranging from 25-40 U. S. cents a case.

The Sales Company as of early February 1966 had available for export a total of about 656,000 cases of tuna in brine, consisting of 588,000 cases of whitemeat and 68,000 cases of lightmeat. After the February sale, the Company was expected to have in stock only whitemeat tuna in cases of 48 7-oz. cans. (Suisan Tsushin, February 1, 5, & 7, 1966, and other sources.)

January 1966: The Japan Canned Tuna Sales Company planned to offer for the January 1966 sale a total of 320,000 cases of canned tuna in brine for export to the United States. This quantity was the remainder of the 500,000 cases of canned tuna authorized earlier by the Japanese Government for export during December 1965-January 1966, pending conclusion of a new exporters agreement (old agreement expired November 10, 1965). In December 1965, a total of 180,000 cases were sold to exporters.

For the January sale, the Sales Company announced a price increase of 50 cents a case for both whitemeat and lightmeat tuna packed in 7-oz. cans (48 cans per case) to $10.20 and $8.65 a case respectively, f.o.b. This was the second price increase in two months. In December 1965 the Sales Company raised prices an average of 70 cents a case for whitemeat tuna and 20 cents a case for lightmeat tuna. (Katsuo-Maguro Tsushin, January 14, 1966.)

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EXPORTERS' VIEWS ON PACKERS' PROPOSAL TO CHANGE CANNED TUNA EXPORT POLICY:

The Japan Tuna Packers Association, following a meeting held February 7, 1966, announced its intention to approve the export of canned tuna in oil to the United States and of canned tuna in brine to Europe. At present, Japanese canned tuna exports to the United States are limited to tuna packed in brine. Exports to Europe are limited to oil-packed tuna.

Concerning this proposed change in policy, Japanese trading firms were reported to hold these views:

(1) Exporters have been wanting to export canned tuna in oil to the United States and therefore welcome this proposal. However, in view of the 35-percent ad valorem duty assessed by the United States on canned tuna in oil imports, it is inconceivable that the proposed export approval would immediately result in volume sales of that product to the United States. In fact, it is possible that no sales will be made for a while, and even in the future no hope can be held for large shipments. If any at all, chunk-style canned skipjack tuna appears to hold some promise, but even that product would be difficult to export unless the ex-vessel price of skipjack in Japan drops considerably.

Japan (Contd.):

(2) Assuming B-grade canned tuna in brine can again be packed in large quantities, exporting that product to Europe would be preferable to exporting it to the United States. The trading firms therefore support the Association's proposal, but believe it will likely take a long time to establish in Europe a market for canned tuna in brine such as that which exists in the United States. (Suisan Tsushin, February 10, 1966.)

Note: Under the U. S. Tariff Act, canned tuna in brine imports not in excess of 20 percent of the U. S. domestic pack of canned tuna in the preceding year are dutiable at the lower rate of 12½ percent ad valorem. Imports in excess of that quota are dutiable at 25 percent ad valorem. A 35-percent duty is levied on imports of canned tuna packed in oil.

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TUNA LANDINGS IN YAIZU, JAPAN, JANUARY 1966 AND YEAR 1965:

January 1966 fish landings at the Japanese port of Yaizu (principal tuna port) totaled 8,078 metric tons, an increase of 997 tons over the same period in 1965.

Landings in Yaizu, Japan, January 1966 with Comparisons

Species	January 1966		January 1965		December 1965		December 1964	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Metric Tons	US$1,000	Metric Tons	US$1,000	Metric Tons	US$1,000	Metric Tons	US$1,000
Bluefin	5,677	3,128	5,025	2,278	7,345	3,942	7,016	3,394
Albacore	703	303	540	194	995	391	822	270
Skipjack	717	180	328	69	1,478	344	1,852	373
Mackerel	222	35	481	80	-	-	-	-
Others	759	203	707	157	2,253	362	1,072	265
Total	8,078	3,849	7,081	2,778	12,071	5,039	10,762	4,302

Fish landings at Yaizu, in December 1965 totaled 12,071 metric tons valued at 1,814 million yen (US$5.04 million), according to data published by the Yaizu Fishery Cooperative Association. This was 54 percent more in quantity and 84 percent more in value than landings in November 1965, which totaled 7,863 metric tons valued at 987 million yen ($2.74 million). Compared to December 1964, landings in December 1965 were up 12 percent in quantity and 17 percent in value.

January-December 1965 fish landings at Yaizu were 149,168 metric tons valued at $49.2 million, compared with 147,353 metric tons valued at $42.6 million in 1964. By species, the quantities landed in 1965 were: bluefin 63,416 metric tons; albacore 30,396 tons; skipjack 31,485 tons; mackerel 14,927 tons; others 8,944 tons. (Kanzume Nippo, February 7, 1966, Suisancho Nippo, January 8, 1966.)

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TUNA MOTHERSHIP-TYPE PURSE-SEINE TEST FISHING OFF WEST AFRICA:

The Japanese mothership-type purse-seine test fishing in the Atlantic off West Africa in 1965 was far from satisfactory, according to the Managing Director of the firm conducting the operation. However, he said ". . . but we plan to expand our operations in 1966." He made the statement after he returned from an inspection trip to the Atlantic. According to the Managing Director, a pair of 2-boat purse-seiners (90 gross tons each) will be dispatched to join the firm's Atlantic fleet, led by the 1,600-ton mothership Chichibu Maru and including the 145-ton pair-boat purse-seiners Kuroshio Maru Nos. 81 & 82.

In 1965, the Chichibu Maru fleet landed 4,000 metric tons of fish, consisting of 45 percent skipjack tuna, 35 percent yellowfin tuna, and 20 percent bonito. (Note: Earlier reports indicated the catch consisted of 50 percent yellowfin, 40 percent skipjack, and 10 percent miscellaneous species.) The Managing Director stated the rapid current flow and depth of the thermocline (about 160 feet) created problems in setting on fish but the firm hoped to overcome those conditions by enlarging the mesh size of the purse seine and by making other modifications. (Shin Suisan Shimbun Sokuho, January 19, 1966.)

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GOVERNMENT-INDUSTRY REPORT ON ASSESSMENT OF TUNA RESOURCES:

The Japanese Government, after meeting with the tuna industry on January 27, 1966, released a report entitled, "Assessment of the Current Tuna Fishery and Direction of Countermeasures." The report consolidates the views of Government and industry officials exchanged at five earlier discussion meetings aimed at seeking ways and means of helping

Japan (Contd.):

the depressed tuna fishing industry. The gist of the report was:

(1) Resources: When consideration is given to the results of analysis performed on the 1962-63 data and to the catch effort and catch volume after 1963, the possibility that reproduction of resources has not been maintained is conceivable. However, the present status of the resources is not known since the analysis of recent data has not been completed. In order to assess the condition of resources, the collection of data, expansion of the research structure, and the automation of data processing should be promoted. Catch effort should be held at the present level until the condition of the resources and trends can be definitely grasped.

(2) Current resource assessment by species: The albacore resource in the North Pacific has generally leveled off and recruitment has not changed significantly. Other than in the North Pacific, catches will tend to decline.

Size of the yellowfin stock, in terms of number of fish available to the long-line fishery, in the Pacific Ocean east of 180° longitude declined to 50 or 25 percent of the initial stock size during the period 1952-62, so increases in total catch beyond the present level cannot be expected. In the Indian Ocean it has decreased overall to 50 percent or less during the period 1952-62. In the Atlantic Ocean it has declined to approximately one-third during the period 1956-62.

The total catch of big-eyed tuna in the Pacific Ocean reached a peak in or about 1961-62. The bluefin resource off Japan is believed to have increased since 1960. The total catch of southern bluefin is believed to have reached the maximum level. The present state of skipjack resource is unknown.

(3) International developments: In the eastern Pacific and Atlantic Oceans, movements are under way to internationally regulate the tuna fisheries based on scientific research, and there are indications of further expanding regulations to cover other areas. In view of the strong interest in the tuna fishery shown by other countries, a worldwide increase in fishing intensity likely will continue in the future unless international restrictions are imposed to manage the resources. Japan should positively assume the position of leadership in the movements aimed at international management of the resources.

(4) Development of new fishing grounds: On the whole, great hope cannot be placed on untapped resources.

(5) Management conditions: Management conditions are considered as having generally deteriorated, and since 1964 management has been beset by numerous adverse factors. As a result, some fishery operators have gone bankrupt or are on the verge of bankruptcy. Under present conditions more bankruptcies are likely to occur. To improve management and to rationalize operations in order to strengthen Japan's competitive position internationally, existing governmental restrictions should be relaxed as much as possible.

A basic policy to improve the economic position of fishery operations, and to stabilize and rationalize management should be developed and progressively implemented. For the time being, it would be desirable to develop special financial measures in parallel with the financial effort expended by the industry. In implementing the basic measures, the situation confronting the fishery operators must be studied. Problems, such as bankruptcy, arising in the course of rationalization, should be dealt with appropriately in order not to adversely affect other industries. It is desirable to increase the catch per unit of effort, and to achieve this aim the opinion has been raised that the overall catch effort should be reduced.

(6) Factors adversely affecting management: They include the rising cost of labor and other expenses, fish price fluctuations, reliance on investment loans, inadequate financial management, unsound financial plans, and weak management base. To overcome them, the adoption of labor-saving techniques, capital accumulation, and sound management practices are essential.

(7) Assessment of current marketing and sales practices: To satisfy foreign demand, close to 50 percent of the tuna catches are exported in frozen or canned form, and their quantities are steadily increasing. However, exports of yellowfin tuna products are gradually declining. In view of the advancement into the tuna market by other countries, Japan must actively develop new frozen and canned tuna markets in the United States and Europe.

Japan (Contd.):

Exports of Atlantic albacore should be regulated and the domestic albacore market expanded. From catch to sales, the fishermen, producers of export fishery products, domestic buyers, and trading firms must maintain close contact with each other to improve the method of sales under a unified overall plan so as to sell good quality products at stable and reasonable prices. Since excessive participation of trading firms in fishery operations is likely to hamper production and sales activities, there is a need to cooperate with financial institutions in seeking ways of eliminating those problems soon. (Suisancho Nippo, January 29, 1966.)

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EXPORTS OF FROZEN RAINBOW TROUT, NOVEMBER 1965:

Japan's exports of frozen rainbow trout in November 1965 dropped substantially as compared with the previous month--about 26 percent in quantity and about 36 percent in value. The entire decrease was accounted for by a drop in exports to the United States, which nevertheless still remained Japan's best customer for this product, taking slightly over 60 percent of the total in November 1965.

Japan's Exports of Frozen Rainbow Trout by Country of Destination, November 1965

Destination	Quantity	Value
	Short Tons	US$
United States	80	57,069
United Kingdom	12	7,986
Belgium	28	20,619
Canada	11	8,533
Netherlands	6	4,664
Norway	6	3,872
Australia	6	4,606
Sweden	1	711
Other	3	1,861
Total	153	109,921

Source: Japan's Bureau of Customs.

There were increases in exports to Belgium, Norway, and Australia, whereas there were decreases in exports to the United Kingdom, Canada, and the Netherlands. (Fisheries Attache, United States Embassy, Tokyo, January 19, 1966.)

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EXPORTS OF MARINE PRODUCTS, SEPTEMBER 1965:

Japan's exports of marine products during September 1965 consisted of principally fresh and frozen fish, and canned fishery products.

Japan's Exports of Marine Products, September 1965

Product	Quantity	Value
	Metric Tons	US$ 1,000
Fresh & Frozen Fish:		
Tuna, skipjack	400	61
Tuna, other	13,458	4,719
Marlin	1,041	725
Sea bream	4,101	616
Mackerel	157	30
Saury	284	83
Salmon	12	19
Other fish	3,126	1,167
Total	22,579	7,420
Cured:		
Cod	8	5
Boiled & dried	29	11
Shark fins	82	144
Other	12	8
Total	131	168
Shellfish, etc., fresh, frozen, dried:		
Scallops	2	16
Oysters	19	22
Shrimp	196	363
Squid	2,143	377
Octopus (fresh)	54	25
Other	9	13
Total	2,423	816
Canned:		
Salmon	6,044	9,444
Tuna, skipjack	979	780
Tuna, other	1,413	1,305
Mackerel	2,074	758
Saury	118	58
Sardine	45	19
Horse mackerel	695	227
Other fish	1,888	1,402
Crab	511	1,466
Shrimp	51	122
Squid	502	166
Other shellfish	797	688
Total	15,117	16,435
Other Products:		
Seaweed, kombu	123	75
Agar agar	51	191
Seaweed, laver 1/	116	5

1/In 1,000 sheets.

(Fisheries Attache, United States Embassy, Tokyo, January 19, 1966.)

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EXPLORATORY TRAWL FISHING IN SOUTHERN LATITUDES:

The 757-ton Japanese trawler Chiyoda Maru No. 5, dispatched by a Japanese fishing firm to the Antarctic Ocean to develop new fishing grounds, was reported to be operating near Falkland Island, off the southeastern coast of South America. Her catches consisted mainly of "merluzza" (hake), which in early December 1965 averaged 4-5 metric tons a day. Other catches included small quantities of shrimp and crab. The trawler continued operations off South America until the end of January 1966, following which she was scheduled to proceed eastward along the latitudes 50°-60° S. toward the waters south of Africa.

Japan (Contd.):

In late November 1965, the Chiyoda Maru explored the waters off New Zealand, where her catches consisted primarily of Spanish mackerel. The expedition has not proven the feasibility of establishing a commercially profitable trawl fishery in the Antarctic waters. (Shin Suisan Shimbun Sokuho, January 19, 1966.)

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FISHERIES AGENCY BUDGET FOR FY 1966:

The Japanese Cabinet on January 14 approved a general account budget for fiscal year 1966 (Apr. 1966-Mar. 1967) for submission to the Diet (parliament), which convenes in late January. Funds requested for the Fisheries Agency, Ministry of Agriculture and Forestry, total 24,200 million yen (US$67.2 million), an increase of 4,002 million yen ($11.1 million) or about 20 percent over 1965's regular fishery budget of 20,198 million yen ($56.1 million). The proposed increase in the fishery budget is considerably higher than any past increases approved by the Cabinet.

Japanese Fisheries Agency Budget for Some Fishery Programs, FY 1966 and 1965

Program	FY 1966 Budget		FY 1965 Budget	
	1,000 Yen	US$	1,000 Yen	US$
Improvement of vessel gear and shipboard medical services	38,000	105,556	-	-
Improvement in weather and fishing forecasts	29,000	80,556	24,000	66,667
Resource conservation (incl. water pollution control)	482,000	1,339,000	473,000	1,314,000
Measures to improve marketing of fishery products	351,000	975,000	252,000	700,000
Sea-farming development surveys	19,000	52,778	12,000	33,333

New programs in the FY 1966 fishery budget include, among others, extension of a $14,000 Government subsidy to improve medical services aboard fishing vessels engaged in high-seas fisheries, $83,000 for installation of labor-saving devices aboard the 602-ton Government research vessel Shoyo Maru, and $7,000 for long-line gear research. The proposed budget also includes a large increase in funds for the promotion of frozen fishery products on the Japanese domestic market and a request for additional funds for sea-farm development projects. (Suisan Keizai Shimbun, January 17; Minato Shimbun, January 15, 1966.)

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CONSTRUCTION OF UNDERWATER RESEARCH VESSEL PLANNED:

The Japan Science and Technology Agency is planning to build an underwater research craft over a 3-year period at a total cost of 300 million yen (US$833,333). The Agency hoped to begin working closely in April 1966 with other concerned agencies on vessel design and other construction details. The proposed 50-foot craft, to be provided with space for 4 persons (including 2 scientists), will be equipped to conduct underwater explorations to a maximum depth of 1,500 meters (4,920 feet). In terms of benefits to the fisheries, the research craft is expected to contribute knowledge heretofore unobtainable on the ecology, behavior, distribution, and migration of deep-water fish, and on oceanographic conditions. (Suisan Keizai Shimbun, January 21, 1966.)

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RATIFICATION OF TWO GENEVA CONVENTIONS EXPECTED:

The Japanese Foreign Ministry and the Fisheries Agency were planning on presenting to the Diet, which convened in late January 1966, bills on ratification of two conventions adopted at the 1958 Geneva United Nations Law of the Sea Conference. The two are: Convention of the Territorial Sea and the Contiguous Zone; and Convention on the High Seas. This move to seek ratification of the two Conventions marks a new departure in Japan's fishery pollicy in that, until recently, Japan had strictly adhered to the principle of the three-mile territorial sea limit and the principle of freedom of the seas. However, as a result of the most recent development wherein Japan accepted the principles of the Geneva Conventions in defining fishery zones in the Japan-Republic of Korea fishery agreement (which took effect following ratification of the treaty to normalize relations between the two countries), it is reported that the Japanese Government decided to defend Japan's rights on the seas in the future on the basis of the principles embodied in the two conventions. (Japan Economic Journal, January 18, 1966.)

Republic of Korea

SHIPBUILDING MISSION FROM JAPAN VISITS KOREA:

The Cooperative Association of Japan Shipbuilders was scheduled in January 1966, to send a mission of some 15 shipbuilding technicians to South Korea for talks on Japan's cooperation in building fishing vessels under the treaty of economic cooperation recently concluded by the two countries.

The Japanese Association is a group of shipbuilders of small and medium size vessels. The mission, comprising experts of major member companies of the Association, was scheduled to stay in Korea for about 2 weeks and exchange views with Korean officials and leaders of the fishing industry on technical and business matters. (The Japan Economic Journal, Vol. 4, No. 159, January 11, 1966.)

Mexico

SHRIMP EXPORTS, 1965:

Mexican exports of shrimp in 1965 fell slightly below 1964, according to preliminary figures released by the Mexican Department of Statistics of the Secretariat of Industry and Commerce.

The 1965 value of shrimp exports was US$44,112,000, down 1.7 percent from the 1964 figure of $44,880,000, which in turn was down sharply from 1963. The above are Customs valuations. Re-evaluated figures of the Bank of Mexico, which reflect changes in actual market prices, show 1963 exports at $51.7 million and 1964 at $53.5 million. Prices continued high throughout most of 1965, and when re-evaluated figures are available they will probably show that 1965's somewhat lower quantity of exports will have about the same value as in 1964.

Shrimp constituted Mexico's fifth most important export in 1965, behind the perennial leaders--cotton, coffee, and sugar--and for the first time behind corn which was in second place. (U. S. Embassy, Mexico, D.F., Feb. 10, 1966.)

Morocco

ATLANTIC TUNA FISHERIES:

With the exception of tuna caught in the "madragues," or fixed nets, off the northwest coast of Morocco, and the canneries dependent on that catch, the local tuna catch is made by sardine boats and packed as a sideline by the sardine canneries. Since the local tuna industry is an offshoot of the much larger sardine industry, it is difficult to obtain precise information on the number and types of vessels used and areas where the fish are caught.

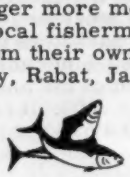
In the five "madragues" located offshore near Larache (two), Mehdia, Acila, and Tangier, bluefin tuna (Thunnus thynnus) are caught during May, June, and July. In 1964, a total of 4,700 tons of mainly bluefin were caught in the "madragues." This catch is sometimes not included in official Moroccan fishing statistics. Other varieties of tuna and tuna-like fish in Moroccan waters (such as bonito, frigate mackerel, swordfish, skipjack tuna, and some bluefin tuna) are caught in small quantities up to 50 miles off the coast from Tangier south to Agadir during the months of June through November. Most of those varieties are caught by sardine vessels using purse seines, but some of the larger fish are caught by hand lines from smaller boats. It is estimated that up to 50 sardine vessels in the 30- to 50-ton class engage in tuna fishing at some time during any given season either when sardines are not available or when the tuna are particularly in evidence. As far as is known there are no plans to build or buy any tuna vessels.

There are six canneries located in Tangier (two), Larache (three), and Kenitra which can tuna exclusively, mainly from the "madragues" with additional supplies trucked in from the southern ports, and 61 other canneries located in Mohamedia, Casablanca, El Jadida, Safi, Essouira, and Agadir which pack tuna as well as their main product sardines. During the 1964/65 season the 67 canneries packed 212,000 cases of tuna (about 39 lbs. per case). During the same season Moroccan canneries packed over 2.3 million cases of sardines and other fish. The capacity for tuna could thus be easily expanded if the supply warranted it since most plants can tuna only as a sideline.

Since the end of the Danguy charter in September 1965, there have been no significant research projects on tuna carried out by

Morocco (Contd.):

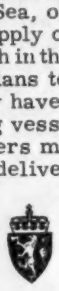
either the Government or private industry. The experience of the small Agadir vessels which fished off West Africa in 1965 reemphasized the fact long known to the local industry that larger more modern vessels are needed if the local fishermen are going to venture far from their own shores. (United States Embassy, Rabat, January 28, 1966.)



Norway

HERRING FACTORYSHIP TO OPERATE IN 1966:

A Norwegian whaling vessel will be converted to operate as a floating herring factory in 1966. The vessel will operate in the Skagerrak Sea, North Sea, or adjacent waters according to the supply of herring. The Norwegian herring catch in the North Sea increased greatly in 1965. Plans to build herring plants in southern Norway have also been discussed. At present, herring vessels working in the more southern waters must travel a considerable distance to deliver to factories in west Norway.



Peru

PERUVIAN FISH MEAL INDUSTRY TRENDS IN 1965, AND FUTURE PROSPECTS FOR 1966:

Peruvian production of fish meal in 1965 dropped to 1,282,011 metric tons, compared to 1,522,214 tons in the record year of 1964. The smaller production was due largely to a drop in the catch of anchovy estimated at about 8 million metric tons in 1965 as against 8.86 million tons in 1964. The amount of fish meal exported by Peru in 1965 was 1,259,417 tons, a decrease of 157,124 tons from 1964.

The Government of Peru has adopted conservation measures. A catch quota has been set of 7 million metric tons of anchovy for use in fish meal for the current open season, October 1, 1965-June 30, 1966. No anchovy fishing for the fish meal industry will be permitted in July, August, and September 1966. The opening of the next season has been set as October 1, 1966, but the closing date is to be selected later and is to be based on recommendations by the Peruvian Instituto del Mar.

Future prospects for the anchovy resource, the basis for the Peruvian fish meal industry, are giving cause for concern. September-December catches in 1965 showed as high as 60 percent immature anchovy, indicating the possibility of a reduced spawning stock associated with spawning season.

It is probable that the annual anchovy catch has reached its peak with the record year of 1964, and, typical of other commercial fisheries, may now begin to stabilize or decline, depending upon the effectiveness of conservation measures.

The reduced catch in 1965 resulted in serious economic hardship for some small fish meal firms operating with little reserve capital and heavily mortgaged equipment. Control of the industry by early 1966 appeared to be settling in the hands of a few large firms.

In addition to resource and economic problems, the industry faced political problems. Peruvian fishermen on a countrywide basis were threatening strikes if they did not obtain satisfaction on salaries, social advantages, and better working conditions. This could mean a minimum cost of US$15.00 more per ton for Peruvian fish meal. Production of fish meal in January 1966 was estimated at about 210,000 tons maximum, or, about the same as in December 1965. U. S. buyers in late January 1966 were paying US$183 per ton for February/March deliveries and US$186 per ton for April/June deliveries. At the January rate of buying, U. S. buyers would have absorbed a minimum of 25,000 to 30,000 tons per month of Peruvian fish meal production for the period February through June.

Considering resource, economic, and political problems now being experienced by the Peruvian fish meal industry, the result could be higher world prices for fish meal and oil in 1966. It might be said, "As Peru goes, so goes the world fish meal market." (Various sources.)

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FISH OIL EXPORTS, JANUARY-SEPTEMBER 1964-1965:

Peruvian fish oil exports in the first 9 months of 1965 were 122,266 tons with a value of $20.4 million, as compared with 90,531 tons valued at only $11.3 million in the same period of 1964. (United States Embassy, Lima, January 9, 1966.)

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Peru (Contd.):

FISHING LICENSES FOR FOREIGN FLAG VESSELS:

The period of license validity for foreign flag vessels fishing for Peruvian companies was liberalized by Supreme Decree No. 16, dated December 28, 1965. Under the terms of the decree, licenses for such vessels will be valid to the end of the calendar year in which they are purchased. (U. S. Embassy, Lima, Peru, January 6, 1966.)

Poland

RECENT FISHERY DEVELOPMENTS:

Fishing Areas and Catches: Like other East European maritime nations, Poland has greatly expanded her marine fisheries. In 1964, her marine fishery landings were 244,000 metric tons, or three times as much as a decade ago. In the first half of 1965, landings amounted to 121,200 metric tons, but reportedly reached 280,000 tons by the end of the year (preliminary estimate). Most of the marine landings do not come from the Baltic Sea as they did in the first 15 years after World War II. In 1964, the Baltic contributed only about 80,000 tons of fish to the Polish catch; over 40 percent came from the North Sea (102,000 tons). The other two major Polish fishing grounds have been the Northwest Atlantic (almost 40,000 tons in 1964) and the area off Northwest Africa (15,000 tons). It was in those two areas that Polish fishing expanded most rapidly in recent years.

In the Northwest Atlantic Fisheries Convention (ICNAF) area, the Poles began to fish in 1961, mostly off the Canadian coast. On Georges Bank, fishing was limited in 1964; only 720 tons of fish were landed by one vessel. However, in August 1965, three Polish large stern trawlers (all newly built in 1964) began to fish on Georges Bank along with 2 Rumanian stern trawlers. It may be expected that the Poles will expand their fishing operations on Georges Bank, and will probably follow the Soviet expansion into the Southern Atlantic and eventually into the Indian Ocean.

Polish Fishing Fleet: Poland ranks third today in world construction of fishing vessels by tonnage (behind Japan and Sweden). Most of the new construction goes for export. Poland has been a major supplier of fishing vessels to the Soviet Union, and in the last few years she began to export her fishing vessels also to France, United Kingdom, and other Western nations.

In January 1965, the Polish fishing fleet numbered about 700 motorized vessels, most of them small cutters (550 units). The rest consisted of large factory stern trawlers (10), factory freezer trawlers (10), medium trawlers (15), steam-powered trawlers (54), side trawlers (44), base ships (2), and supply ships (1). All factory and freezer stern trawlers were added in 1963 and 1964.

Plans for the Future: Poland has ambitious plans for the development of her distant fisheries. The landings are to double by 1970 (to 450,000 tons) mainly due to construction of about 35 large freezer and factory trawlers, 3 motherships, and 2 refrigerator vessels. Catches in the Baltic and North Sea will increase somewhat (to 100,000 and 120,000 tons), but the largest portion of the increased catch will come from the North and Central Atlantic (160,000 and 70,000 tons). Long-term plans provide for another doubling of the catch to 900,000 tons by 1980.

State Versus Private Enterprises: The Polish fishing industry consists of state, private, and cooperative enterprises. The state-owned and controlled fishing enterprises almost doubled their catch from 1961 to 1964 (see table 1), while private fishermen in 1964 landed less than 5 percent of the total catch. Government support in investments, research, modern equipment, and fishermen's training contributed to the rapid growth of state-owned enterprise fishing at the expense of private and cooperative enterprises.

Table 1 - Poland's Fishery Landings by Enterprises, 1961 and 1964

Fishery Enterprises	Quantity	
	1964	1961
	(1,000 Metric Tons)	
State enterprises	211.0	132.0
Cooperative enterprises	21.0	19.0
Private enterprises	21.0	18.0
Total Landings	244.0	169.0

Source: Polish Maritime News

Fishery Trade: Both Polish fishery exports and imports doubled from 1960-1964 (table 2). The most significant trends in imports are continuous increases in fish meal imports and the decline of salted herring imports from the Soviet Union. The entire increase in Polish fishery exports was due to the newly developed markets for fresh and

Poland (Contd.):

Table 2 - Poland's Fishery Trade, 1960 and 1964

	1964	1960
	. . . (Metric Tons) . . .	
Imports:		
Mackerel, frozen	1,450	-
Herring, fresh & frozen	5,583	4,014
Herring, salted	6,490	19,681
Fish fillets	-	1,419
Canned fish	2,069	6,141
Caviar	10	10
Fish meal	55,700	6,406
Total	71,302	37,671
Exports:		
Salmon	209	216
Marine fish	5,559	-
Fresh-water fish	1,403	1,398
Fish, smoked	236	6
Fish, salted	40	2,125
Canned fish	3,695	2,807
Crayfish	20	30
Total	11,162	6,582

Source: Polish Maritime News

frozen marine fish in West African countries, particularly in Liberia, Nigeria, and Ghana. Polish trawlers deliver fish directly from the fishing grounds to local ports. Canned fish exports have also increased greatly; in 1964 Poland exported highly diversified, attractively packed canned goods to more than 30 countries. Canned fishery imports decreased by two-thirds during 1961-1964. Poles now import only canned sardines in oil, a product greatly in demand but not produced domestically.

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POLISH FISHERIES ATTACHE IN GHANA:

Poland is reported to have a fisheries attache in Accra, Ghana. Polish vessels operating off West Africa sell fish directly in ports of Liberia, Nigeria, and Ghana. Those deliveries helped raise Polish exports of fresh and frozen fish to 5,600 metric tons in 1964.

Portugal

CANNED FISH EXPORTS, JANUARY-SEPTEMBER 1965:

Portugal's total exports of canned fish in oil or sauce during the first 9 months of 1965 were up 14 percent from the same period of 1964, due mainly to larger shipments of sardines and mackerel. Sardines accounted for 75 percent of the total canned fish exports in January-September 1965.

Portugal's principal canned fish buyers during the first 9 months of 1965 were Germany with 11,280 metric tons, Italy 9,287 tons,

Portuguese Canned Fish Exports, January-September 1964-1965

Product	1965 Jan.-Sept.		1964 Jan.-Sept.	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	40,747	2,144	37,149	1,955
Chinchards	1,935	102	2,612	137
Mackerel	6,530	261	3,478	139
Tuna & tunalike	2,231	74	1,444	48
Anchovy fillets	2,367	237	2,340	234
Others	572	30	529	27
Total	54,382	2,848	47,552	2,540

the United Kingdom 5,697 tons, France 4,171 tons, the United States 4,090 tons, and Belgium-Luxembourg 3,546 tons. Italy's purchases of canned fish from Portugal in January-September 1965 were almost double those in the same period of 1964, and purchases by Germany were up 25 percent. But purchases by the United Kingdom were down 18 percent. (Conservas de Peixe, November 1965.)

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CANNED FISH PACK, JANUARY-SEPTEMBER 1965:

The Portuguese pack of canned fish in oil or sauce in the first 9 months of 1965 showed some increase (by weight) over the pack in

Portuguese Canned Fish Pack, January-September 1964-1965

Product	1965 Jan.-Sept.		1964 Jan.-Sept.	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	26,815	1,141	34,177	1,799
Chinchards	2,072	109	1,356	71
Mackerel	11,147	446	3,375	135
Tuna & tunalike	6,324	211	4,708	157
Anchovy fillets	3,028	303	2,085	208
Others	1,599	84	534	28
Total	50,985	2,294	46,235	2,398

the same period of 1964 due mainly to a sharp gain in the pack of mackerel. But the important sardine pack was down. (Conservas de Peixe, November 1965.)

Rumania

LANDINGS AND FISHERY TRENDS, 1965:

Rumanian state-owned fishery enterprises landed 44,250 metric tons of fish in 1965 or 37 percent more than in 1964 when 32,404 tons (landed weight) were produced. United

Rumania (Contd.):

States Embassy, Bucharest, February 18, 1966.)

Editor's Note: Until 1964 more than two-thirds of the Rumanian catch consisted of fresh-water species; however, much of the 1965 increase of over 10,000 tons probably came from high-seas fishing. Rumania bought two large stern trawlers from Japan in 1964 and has been fishing off Africa's coast and in the Northwest Atlantic.

Senegal

FISHERIES DEVELOPMENT PROJECT:

The United Nations recently approved the following Special Fund project to aid fisheries in Senegal:

Fisheries development project, prospecting and development of sea fishing resources; fund allocation: $773,000; recipient government contribution: $668,000; duration: 5 years; executing agency: Food and Agriculture Organization. (United States Embassy, Dakar, February 1, 1966.)

Sierra Leone

ATLANTIC TUNA FISHERIES:

Following is a summary of tuna fishing activities off Sierra Leone:

The main tuna fishing areas off Sierra Leone for bait boats is in the triangle 9° N. 15° W., 12° N. 17°30' W., 10° N. 17° W. In 1965, many vessels fished along the edge of the shelf around Cape Palmas. Long-liners travel as far south as Ascension Island.

Four fishing methods are in use: (a) bait fishing from racks, (b) bait fishing with overhead pulleys, (c) long-lining, (d) combination purse-seine and bait (rack) fishing. No purse-seiners were seen in early 1966.

In 1964/65, tuna fishing off Sierra Leone was conducted by some 45 Spanish (Bermeo) vessels 90 feet long and 6 Japanese 120-ft. combination bait long-liners, with occasional visits from 3 or 4 French bait boats (80 ft.) and two new Spanish bait-seiners. Fishing activity has declined recently, and in early 1966 the only tuna vessels in the area were 6 Spanish bait seiners and 4 Japanese vessels.

Sierra Leone's only shore facilities for tuna are in Freetown. They consist of 120 feet of dock with 14 feet of water depth and two jetties; 2,500 tons of cold-storage space; brine tanks for freezing; and 70-ton flake and block ice capacity. There is a pilot cannery.

Plans are under consideration for the extension of frontage, mainly to allow vessels other than tuna vessels to operate from the same base. (United States Embassy, Freetown, February 10, 1966.)

South Africa Republic

ATLANTIC TUNA FISHERIES SITUATION:

From a short survey of the current status of the tuna industry in South Africa, two factors emerge immediately: (1) Tuna fishing, which went through a modest boom period in 1963 and 1964, dropped off sharply in the latter part of 1964. According to an industry spokesman, there has been no commercial tuna fishing by firms in the South Africa Republic since that time. (2) Coincidentally with the fall-off in commercial tuna fishing, South African research on the incidence and habits of the tuna and in methods and extent of tuna fishing has virtually ceased.

Preliminary research conducted by the South Africa Republic Division of Sea Fisheries in 1960 and 1961 revealed the presence of four species of tuna off the Cape west coast: bluefin, yellowfin, big-eyed, and longfin. During the period of research, bluefin and big-eyed tuna occurred in greater numbers during the winter and spring (approximately June to December), whereas longfin and yellowfin tuna were most abundant during spring and autumn (October to December and March to June). Since that time, however, according to commercial and research sources, the movements and incidence of tuna shoals have varied widely, contributing to the industry's problems in mounting successful commercial tuna fishing operations and to reluctance to devote large resources to this type of fishing. Indeed, the Division of Sea Fisheries' Investigational Report No. 47, issued in November 1963, concluded that "too little is known of the long-

South Africa Republic (Contd.):

term pattern of occurrence of the fish to be certain that they will always be present in sufficient numbers to justify commercial operations."

A spokesman for the largest single operator in tuna fishing stated that his company, which entered the field in 1961, ceased tuna operations completely in 1964. By that time, the tuna "seemed to disperse" and tuna fishing had become economically not feasible.

All tuna fishing is thought to have been done by means of long-line gear. An experiment in purse-seine fishing, conducted by the Fisheries Development Corporation (in cooperation with the Division of Sea Fisheries and the fishing industry), from July 1962 to August 1963, produced discouraging results. Very few catchable schools of tuna were encountered, and the fish consistently managed to avoid netting by sounding. In addition, adverse weather conditions severely hampered fishing operations for 130 out of the 218 days in which the experimental ship was operative.

According to the best information available, the ships engaged in tuna fishing included about 40 wooden vessels, varying from 55-72 feet in length, and six 120-150-foot refrigerated steel vessels. Many of these apparently operated on a part-time basis: i.e., they were used for tuna fishing during the off-season months for the pilchard and anchovy industry. Two of the larger vessels, the Marinette (a 110-foot vessel owned by a recently liquidated firm) and the Beau Gest, built by a shipyard in Durban engaged in tuna fishing only briefly. Fishing industry experts in South Africa point to the unfortunate saga of that one firm as an example of the extreme hazards and uncertainty of tuna fishing under present conditions. The firm, formed in 1963, planned to utilize the Marinette as a "mothership," with a flotilla of approximately 8-10 smaller vessels carrying out actual fishing operations. In any event, only the Marinette ever engaged in tuna fishing, which proved unprofitable. The firm, meanwhile, ordered the construction of four or five 300-ton tuna vessels by the shipyard in Durban. The first was completed in June 1965 and subsequently sold in the yard in the wake of the firm's collapse. It is not known for what purpose the vessel will now be used.

Virtually all tuna caught in South African coastal waters was frozen whole and exported. One company dominated the field, although tuna fishing was of considerably less importance in the operations of this company than the more profitable pelagic fishing and fish processing. This company maintains refrigeration facilities at Table Bay, which are now utilized for processing other types of fish. In general, processing facilities now used for pelagic or deep-sea fish could be converted to handle tuna.

No research directly related to the tuna industry is in progress currently. Two earlier research efforts, mentioned above, resulted in printed reports (A Preliminary Report on South African West Coast Tuna, Division of Sea Fisheries Investigational Report No. 47, 1963; and Purse Seine Netting for Tuna in S. A. Waters, by the General Manager of the Fisheries Development Corporation), which appeared in The South African Shipping News and Fishing Industry Review, January 1964. The results of research conducted subsequent to those two reports have not been prepared for publication. (United States Consulate, Cape Town, February 3, 1966.)

South-West Africa

PILCHARD SEASON STARTED JANUARY 31, 1966:

The 1966 pilchard fishing season in the Walvis Bay area of South-West Africa started on January 31, 1966. Of the seven plants in Walvis Bay, one started operating on January 31. Five of the remaining plants were scheduled to start at different times during February. One plant, undergoing extensive rebuilding, was not scheduled to open until late March or early April. (Namib Times, January 14, 1966.)

Spain

FREEZER-TRAWLER FLEET GROWING RAPIDLY:

In 2 years the Spanish freezer trawler fleet is expected to number 97 vessels and produce about 315,000 metric tons of frozen fish annually, according to a Danish report. The Spanish freezer trawler fleet has grown from 3 vessels in 1961 to over 40 vessels in 1965. Landings from the Spanish freezer fleet

Spain (Contd.):

were expected to total 105,000 metric tons in 1965.

Taiwan

LANDINGS IN 1965:

Taiwan's fishery landings (including marine, freshwater, and fish culture production) in 1965 totaled about 377,000 metric tons or approximately the same as in 1964, when 376,400 tons were produced. The total fish production goal for 1965 was set at 388,000 tons under Taiwan's 4-Year Development Plan. The failure to attain this goal was due to several unusually severe typhoons which hampered fishing operations, and changes in the migration patterns of offshore pelagic species. However, the 17 new tuna fishing vessels purchased with International Bank for Reconstruction and Development financing are now operational and will help to contribute to Taiwan's fisheries output. (United States Embassy, Taiwan, January 29, 1966.)

Note: See Commercial Fisheries Review, July 1964, p. 93.

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TUNA FISHING OFF SOUTH AFRICA:

Three trawlers from Taiwan arrived in Cape Town in late 1965 to start tuna fishing off the Cape. They planned to spend about a year off the west coast of South Africa. Later they may operate as far north as the coast of South-West Africa where Japanese and Israeli vessels are also fishing for tuna. (Namib Times, December 17, 1965.)

Trinidad and Tobago

TUNA FISHERIES, 1965:

The tuna fisheries of Trinidad and Tobago are not indigenous. Rather, Trinidad is used as one of a string of bases in the Atlantic by the Japanese tuna fishing fleet. Port-of-Spain is used primarily as a transshipment point, although of course, bunkering and procurement of supplies is effected as needed. The total Japanese Atlantic tuna fleet consisted of some 200 boats two years ago, but has now dropped to about half that number because of declining catches.

Up until a couple of years ago, the Atlantic tuna fishing grounds were apparently fairly well established and known to all in the trade. About 80 percent of the catches brought into Port-of-Spain then consisted of albacore and big-eyed. Albacore was caught in the Caribbean-West Indies area, big-eyed off the coast of Africa (Freetown, Dakar area), and both of those off Brazil. Of late, however, because of falling catches there have been no fixed grounds. The fishermen have had to search for tuna, and the composition of catches has been quite erratic. The varieties caught and brought to Port-of-Spain include albacore, yellowfin, big-eyed, a tuna-type fish called black marlin (which may be blackfin), straight marlin, small quantities of bonito and swordfish, kingfish, and sailfish.

All of the fishing done by the Japanese vessels is long-line fishing.

The Japanese boats using Trinidad as a base are the regular small-sized Japanese long-line tuna fishing vessels, i.e., 250-300 tons. Some 23 vessels are presently operating fairly regularly out of Port-of-Spain, although other vessels do call at irregular intervals as they cruise around the Atlantic. There is no local construction of tuna vessels in Trinidad and none contemplated.

The largest user of local facilities is a Japanese company. This group has arrangements to use in-bond cold storage and landing facilities owned by a local firm. Space in these cold storage rooms for about 1,400 tons of tuna is presently allocated for this purpose, and the tuna is re-exported to destinations such as the United States (albacore and yellowfin), Japan (marlin, black marlin and bluefin), and neighboring areas such as Venezuela, Barbados, Dominica and Martinique. There is no special technology used, handling is by means of forklifts, forklift baskets and hand labor; and there are no plans for expansion of facilities used only for tuna since the catch is down.

About three Japanese tuna boats from other companies use the services of other local shipping agents fairly regularly, but these transship directly from trawler to ship without the catches coming ashore. Port-of-Spain is a major port with bunkering facilities, boatyards, etc. Additional general purpose facilities such as cold-storage space can presumably be made available for tuna fisheries usage should the demand arise.

Trinidad and Tobago (Contd.):

There is no research being conducted by the local Government in the field of tuna. The U. S. Department of the Interior's Bureau of Commercial Fisheries is providing professional assistance for a U. N. Special Fund regional survey of Caribbean fishing grounds, aimed at developing the (general) fishing industry in the area. However, the activities of a Japanese Government survey boat, which recently passed through Port-of-Spain, are apparently focused much more directly on tuna. (United States Embassy, Port-of-Spain, January 27, 1966.)

Tunisia

MEDITERRANEAN TUNA FISHERIES:

Only one species of tuna is fished by Tunisia--bluefin (Thunnus thynnus). It is caught along the northeast coast during the months of July and August while the tuna is moving toward Sicily to spawn.

The tuna is caught with tuna nets ("madragues") fixed in place at the beginning of the season. They are composed of a series of nets spread out over several miles along the coast to a depth of 115-131 feet. Four "madragues" are in use and are the property of the Tunisia National Fisheries Office.

This method precludes the use of vessels in the actual fishing process. However, wooden barges or lighters are used to collect the fish from the nets. Eventually the Office hopes to acquire vessels capable of operating in the Atlantic in order to fish yellowfin and albacore tuna.

There are two canneries presently processing tuna in Tunisia. The larger of the two is at Sidi-Daoud and the other is in Mahdia. They employ modern equipment and have a total capacity of 40 metric tons of fish a day. The tuna is canned both in olive oil and in natural juices for home consumption and export, mainly to France.

Frozen tuna is occasionally imported from Norway and Japan for canning and later exported to Europe.

No extensive biological or technical research is presently underway. Some tagging of tuna for tracking purposes was begun by the Oceanographic Institute of the Tunisian Government in May 1965. (United States Embassy, Tunis, February 10, 1966.)

U.S.S.R.

FISHERY LANDING TRENDS IN 1964-1965, AND OUTLOOK FOR 1966-1970:

The preliminary draft of the Soviet 5-Year Plan for the development of the fishing industry in 1966-1970 provides for a 50-percent increase over the 1965 fishery landings by 1970 so that total fishery production in 1970 should reach 8.5 million metric tons. Of this, 7.8 million tons is estimated to be fish catches, and the rest whales, marine animals, and other aquatic products. Most of the fish are expected to be caught on the high seas.

In 1964, the Soviet Union caught 5,121,000 metric tons of aquatic products. According to Food and Agriculture Organization (FAO) statistics, the Soviet marine and fresh-water fish catch in that year amounted to 4,475,000 metric tons, indicating that the almost 650,000 metric tons of other catches represented were whales, marine animals, and other marine products. It is interesting to note that the greatest increase in landings under the new plan is expected to come in the fish catch. The catch of whales and other marine mammals may even decrease somewhat, but may be compensated for by increased catches of other marine products, especially seaweed. In any event, the nonfish Soviet landings are expected to remain static during the next 5 years, amounting to about 700,000 metric tons in 1970.

During 1965, Soviet spokesmen repeatedly mentioned 10 million metric tons of fishery landings as the goal for 1970. This has now been scaled down to 8.5 million tons.

On December 24, the 1965 Soviet catch goal of 5.6 million metric tons of fish, shellfish, whales, marine mammals, and other marine products was attained. The 1965 catch was 10 percent greater than the 1964 catch of 5.1 million tons. A 10-percent increase is also planned for 1966 when total U.S.S.R. landings should reach 6.2 million metric tons. If the present rate of increase continues, the U.S.S.R. by 1967 or 1968 could become the leading fishing nation in the world. (The Fish-

U.S.S.R. (Contd.):

ing News, November 1965, and other sources.)

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INDIAN OCEAN FISHERY TRENDS:

Indian Ocean operations of the Soviet fishing fleet are expected to be greatly increased during the next 5 years. By 1970, the Soviets plan to catch 190,000 metric tons in that area; much of the catch may consist of tuna. Soviets began large-scale fishing operations in the Indian Ocean in 1964-1965. By 1964, they had developed a successful Indian Ocean shrimp fishery, and in 1965 they began tuna fishing in the area with Japanese-built factoryships. Total landings from that area, however, were small. Most of the Soviet vessels come from Black Sea ports through the Suez canal, but their exact number is unknown.

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FISHING FLEET EXPANSION PLANNED FOR 1966-1970:

The Soviet Union plans to add 1,500 vessels to her fishing fleet during the 5-Year Plan (1966-1970). Most of those will be built in domestic shipyards, but foreign purchases (especially from Eastern Europe) will also be numerous. The additions will consist of 13 different classes. Among the larger types of vessels, the following planned additions are known: 150 large stern freezer trawlers (Maiakovskii class from U.S.S.R. and Kosmos class from Poland), 100 large tropical stern trawlers (Tropik class from East Germany), a 40,000-gross-ton giant fishing mothership (Vostok class, now being built at Leningrad), 145 refrigerated fish carriers (many purchased in Western Europe), undetermined number of floating fish factories (U.S.S.R., West German, and Japanese construction), and others. Soviets admit that "there is not enough room" on existing fishing grounds for all of these vessels, and say the only way to successfully use the new additions is for them "to conquer new, unexploited fishing grounds." Most of these would be in the South Atlantic, South Pacific, and Indian Ocean. During the next 5 years, there probably will be increased Soviet fishery research effort, increased pressure on world fishery resources, and more joint Soviet enterprises with other nations.

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NEW JAPANESE-BUILT FACTORYSHIP FOR SOVIET PACIFIC FLEET:

The Japanese-built fish factoryship Spassk (18,000 gross tons) was turned over to the Soviet Union's Far Eastern fishing fleet in January 1966. The vessel has refrigerated holds with a capacity of 14,300 cubic meters. Plans call for a total of 8 vessels of this class to be built at a Yokohama shipyard for the U.S.S.R. by the end of 1966. It is believed that they will all operate in the North Pacific Ocean and Bering Sea.

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FISHERIES AIDED BY GROWING FLEET OF TRANSPORT VESSELS:

The Soviet Far Eastern Fisheries Administration had a total of about 100 refrigerated fish carriers and other fish transports in service as of January 1, 1966, in the Pacific Ocean and Bering Sea. In January 1959, less than 50 Soviet fish transports were available in the Far East. The total number of U.S.S.R. fish carriers at the end of 1964 exceeded 300 units.

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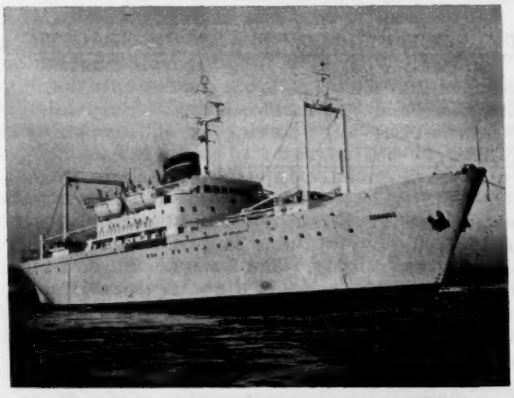
FREEZER-TRAWLER "PAVLOVO" DELIVERED TO SOVIETS BY DANISH SHIPYARD:

The freezer-trawler M/S Pavlovo was delivered to V/O Sudoimport, Moscow, January 7, 1966, by a Copenhagen shipyard. The vessel is one of a series of freezer trawlers for the U.S.S.R. being built by the Danish shipyard to the following specifications: length



The M/S Pavlovo, a freezership which can also be used as a stern trawler.

U.S.S.R. (Contd.):

between perpendiculars 91 meters (298.5 feet), breadth 16 meters (52.5 feet), and deadweight tonnage 2,550 to 2,600 metric tons. The first in the series was the M/S Skryplev launched May 10, 1962.

The M/S Pavlovo is reported to be equipped with butchering lines to head and gut fish and airblast freezers to freeze dressed fish in blocks in metal pans. The vessel may receive fish from accompanying trawlers, or it may operate as a stern trawler itself. Speed on loaded trials was 14.0 knots. (Assistant Regional Fisheries Attache, United States Embassy, Copenhagen, January 19, 1966.)

Note: See Commercial Fisheries Review, Sept. 1965 p. 76.

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NORTH ATLANTIC STUDIES OF OCEAN PERCH:

The Soviet fishery and oceanographic research vessel Neptun left her home port of Murmansk in late January 1966 for a research cruise in the areas southwest and west of Iceland. The purpose of the cruise was to investigate large ocean perch schools believed by Soviet biologists to inhabit those waters, and to test new fishing gear. The vessel belongs to the Soviet Polar Institute of Marine Fisheries and Oceanography (PINRO) of Murmansk.

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POLLOCK FISHERY IN WESTERN PACIFIC:

In early February 1966, over 100 Soviet seiners and trawlers from the Kamchatka, Sakhalin, and Primorskii Krai Fishery Administrations were fishing for walleye pollock (Theragra chalcogramma) in the Sea of Okhotsk off Kamchatka's west coasts. In 1964, the U.S.S.R. landed 213,600 metric tons of walleye pollock (also known as Alaska pollock); in 1966, the Soviets plan to catch over 300,000 tons by late spring. The Soviets sell some pollock to the Japanese directly in the fishing area. In addition to direct deliveries aboard Japanese fish meal factoryships (45,000 metric tons in 1966), the Soviets export walleye pollock to other Asian countries. Most of Soviet domestic pollock landings are reduced into fish meal; vitaminized medicinal fish oil is also produced from it.

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OCEANOGRAPHIC RESEARCH IN THE SOUTHERN PACIFIC:

The Soviet oceanographic vessel Vitiaz stopped briefly in the Japanese port of Nagasaki in mid-February 1966 before sailing for southern Pacific waters where research was to be conducted by a party of oceanographers from the U.S.S.R. Academy of Sciences. From December 1965 to February 1966, the vessel had participated in a study of the Kuroshio Current off Japan.

United Arab Republic

FISHING FLEET EXPANSION WITH SOVIET AID PLANNED:

Plans of the United Arab Republic to buy Soviet vessels and begin high seas fishing were announced to the Egyptian National Assembly February 12, 1966, by a Deputy Premier. Although the type of vessels to be purchased was not announced, it is thought that they may be large stern trawlers such as the U.S.S.R. recently also began exporting to Greece.

United Kingdom

INTERNATIONAL FOOD FAIR AT MANCHESTER:

An international food fair will be held in Manchester, England, May 10-21, 1966.

In 1965, the Manchester fair, a major food fair in the English industrial Midlands, attracted 14,000 grocery operators and approximately 44,000 other tradesmen. This year the exhibit will feature a trade area, demonstration kitchen, and restaurant, and will be supplemented by an instore promotion in 1,000 retail outlets.

Each participating fishery firm at the fair will have display facilities equipped with shelves and a storage cabinet for sampling and promotional literature. Frozen products will be displayed in cases, furnished without charge, centrally located for common use by all exhibitors supplying frozen fishery products. Each participating firm will be required to provide a company representative or agent to attend its display full-time and to actively promote the company's branded products.

United Kingdom (Contd.):

United States firms were invited to participate in the Manchester fair. International food fairs offer an excellent opportunity to expand foreign trade.

Venezuela

TUNA FISHERIES, 1965:

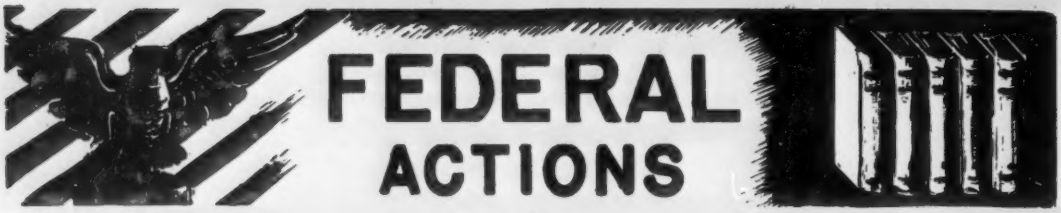
The Venezuelan tuna fleet operates in the southeast Caribbean and western Atlantic between Trinidad and the Guianas. Generally speaking, fishing is confined in the Caribbean between longitudes 62° and 69° W. and latitudes 12° and 17° N. and in the Atlantic Ocean between 49° and 59° W. and 7° and 12° N. In the Caribbean zone the fishing effort is concentrated between 65° and 68° W. and 12° and 17° N. to the west of Las Aves submarine ridge and between 62° and 63° W. and 12° and 14° N. to the east of this ridge. There is little fishing over most of the ridge. The catch averages about 70 percent yellowfin, 20 percent albacore and 10 percent big-eyed tuna. Occasionally, a bluefin tuna is landed and a few marlin (agujas) and sharks (cazones) are captured. Fishing is year round.

Long-line fishing is the principal method of taking tuna. The largest vessel utilizes 400 baskets (5 hooks to the basket); a few boats work with 200 to 260 baskets; the majority of the fleet operates with 100 to 120 baskets; and a few of the smaller vessels carry less than 100 baskets. The sardine (Sardinella) is used as bait. The catch rates are placed at 1 to 8 percent for yellowfin and up to 2 percent for albacore.

Venezuela's tuna fleet consists of 3 long-liners of Japanese origin--one of 150 tons and two of about 50 tons each--and 43 small converted fishing craft (formerly used to fish red snapper). The small craft are 20 to 30 meters in length with capacity ranging from 7 to 30 tons. The Japanese long-liners operate with mixed crews. The small boats have a crew of 5 to 10 men--12 at the most--who often are a "family group." Some consideration is being given to acquisition of additional tuna vessels but no firm decisions have been reached. Boats being built in shipyards of the canneries are small. Venezuela has no commercial shipyards building fishing vessels, and facilities for maintaining the larger tuna vessels are limited and expensive. Additions by conversion of small line-fishing boats to tuna long-liners can be expected, particularly in years of good tuna fishing. The same boats, however, will continue to occasionally engage in bottom long-lining for snapper and grouper.

Shore-based facilities are very limited at both Cumana and La Guaira for landing tuna. Six canneries are located in Cumana, one at Mariguitar, and one in Porlamar. The eight plants have a production capacity adequate to process the 12,000 tons considered to be the national market's potential. A Government development agency for some time has had under consideration the development of a fishing port in eastern Venezuela at Puerto de Hierro (Gulf side of the Paria Peninsula). No firm decision has been reached to date. There has been no technological improvements in handling tuna on shore. Technicians are trying to influence captains of the small tuna boats using ice to limit trips to three to five days duration.

In 1964, Venezuela's Center of Fisheries Investigation, with the backing of the National Fund of Agricultural Investigations, started a study program of its tuna industry in view of the rapid growth. The first task of the study was to establish basic parameters such as fleet size, overall catches, areas of fishing, etc. Log books were prepared and given to boat captains as a method of obtaining precise data on place and date of fishing, time of set, number of baskets and type of tuna with its estimated weight. The Center's program also included sampling of commercial catch for body dimensions, weight, gonad size and state, stomach contents, etc. These studies are to provide data for length-frequency and length-weight studies and for morphometric-meristic work. As very few boats have good refrigeration equipment, captains gut the catch at sea and very few whole fish are available for study. The program is limited to those measurements largely unaffected by gutting. Some captains do bring in gonads in plastic bags provided by the Center marked to correspond to the fish. The Center has equipment available for studies involving electrophoresis and chromatography. The Center's first report is under preparation. (United States Embassy, Caracas, Venezuela, January 28, 1966.)



Department of Commerce

ECONOMIC DEVELOPMENT ADMINISTRATION

FEDERAL FUNDS TO AID REHABILITATION OF LAKE SUPERIOR FISHING INDUSTRY:

A technical assistance project to revive and diversify the Lake Superior commercial fishing industry, approved in December 1965, will provide about $200,000 in Federal funds to carry out the program. The new Economic Development Administration, U.S. Department of Commerce, will contribute $185,000, and the remainder will come from the Bureau of Commercial Fisheries, U. S. Department of the Interior.

The funds will be used to develop means for producing, processing, and marketing the various less-valuable Lake Superior species--herring, chub, smelt, and alewife. Trawling techniques will be tested for more economic production of those underutilized fish. The program also will include setting up a pilot-processing plant to produce and market new food items from the available species. Although the outlook for rehabilitation of the lake trout in Lake Superior is promising, for the short term and in order to broaden the economic base of the fishing industry, there is need for fuller utilization of the less desirable species which presently are in good supply.

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STUDY GRANT MAY LEAD TO FISH MEAL INDUSTRY IN TENNESSEE:

Approval of $103,000 for a study on the feasibility of establishing a fish meal industry in Tennessee was announced February 14, 1966, by the Economic Development Administration (EDA) of the U. S. Department of Commerce.

The study will determine whether sufficient quantities of fish suitable for reduction to meal can be caught in the streams and reservoirs of Tennessee to justify commercial harvesting and processing. The funds will provide for the year-long testing of various types of fishing gear and for laboratory analysis of the catch.

Operation of a large fish-meal plant would employ as many as 70 persons in economically depressed areas of Tennessee and also assure more regular employment for those already engaged in fishing.

The Economic Development Administration will furnish the $103,000. Another $24,000 will be supplied by the Tennessee Game and Fish Commission, which requested the study, the Tennessee Valley Authority, the University of Tennessee, and the Bureau of Commercial Fisheries, U. S. Department of the Interior, which will monitor the study and administer the technical assistance grant.

EDA was set up under the Public Works and Economic Development Act of 1965 which authorizes financial assistance to create permanent new jobs in those areas of the Nation suffering from high unemployment or low family income.

EDA's technical assistance program, which is financing the fish-meal study, helps provide information needed to spur economic growth. Other phases of the EDA program include financial assistance in the form of public works loans and grants, and loans.

If the results are favorable, the fish-meal study could have economic impact not only in Tennessee and its sister TVA states but also in Oklahoma, Arkansas, Missouri and other states with large bodies of fresh water.

Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Leigh Sydney Wright, Box 8, Hoonah, Alaska 99829, for the purchase of a used 34.8-foot wood vessel to engage in the fishery for salmon. Notice of the application was published by the U. S. Department of the Interior's Bureau of Commercial Fisheries in the Federal Register, February 10, 1966.

Winfred D. Cole, P. O. Box 1239, Aransas Pass, Tex. 78336, for the purchase of a used 49-foot registered length wood vessel to engage in the fishery for shrimp. Notice of the application was published in the Federal Register, February 11, 1966.

James Joseph Mello, Hill Road, Snug Harbor, Wakefield, R. I. 02879, for the purchase of a used 80-foot vessel to engage in the fishery for lobsters, groundfish, flounders, and fish for industrial uses. Notice of the application was published in the Federal Register, February 12, 1966.

Robert James Leekley, Box 217, Petersburg, Alaska 99833, for the purchase of a used 43.7-foot registered length wood vessel to engage in the fishery for salmon, halibut, and black cod. Notice of the application was published in the Federal Register, February 15, 1966.

Robert Miles Barber, Route 2, Box 213, Coos Bay, Oreg. 97421, for the purchase of a used 32.8-foot registered length wood vessel to engage in the fishery for crab and miscellaneous species of edible fish. Notice of the application was published in the Federal Register, February 15, 1966.

Jack J. Childers, 1805 West Seventh St., Port Angeles, Wash., 98362, for the purchase of a used 40.6-foot registered length wood vessel to engage in the fishery for salmon, halibut, cod, and tuna. Notice of the application was published in the Federal Register, February 18, 1966.

Charles Roy Lesher and Phyllis A. Lesher, 335 West 12th St., Juneau, Alaska 99801, for the purchase of a used trolling vessel to engage in the fishery for salmon. Notice of the application was published in the Federal Register, February 22, 1966.

Thane B. Ohler, Box 691, Blaine, Wash. 98230, for the construction of a used 29.9-foot registered length vessel to engage in the fishery for salmon and Dungeness crab. Notice of the application was published in the Federal Register, February 24, 1966.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).

Note: See Commercial Fisheries Review, March 1966 p. 72.

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HEARING ON APPLICATION FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Victoria Fishing Corp., 136 Campbell St., New Bedford, Mass., has applied for a fishing vessel construction differential subsidy to aid in the construction of a 90.75-foot overall wood vessel to engage in the fishery for groundfish, scallops, flounder, lobster, and swordfish.

A hearing on the economic aspects of this application was scheduled to be held. The U. S. Department of the Interior's Bureau of Commercial Fisheries published the notice of the application and hearing in the February 24, 1966, Federal Register.

* * * * *

REVISED U. S. STANDARDS FOR FROZEN RAW BREADED SHRIMP--REQUIREMENTS FOR CONDITION OF COATING STILL BEING EVALUATED:

The revised U. S. Standards for Grades of Frozen Raw Breaded Shrimp are being phased in gradually. The effective date for the condition of coating factor was extended until February 7, 1966, to give the breaded shrimp industry an opportunity to submit data supporting their position for modification of the condition-of-coating factor.

A further extension of the effective date for the condition-of-coating factor was given to allow additional studies to be conducted. Accordingly, this factor shall become effective at the beginning of the 60th calendar day after February 7, 1966. The notice as it appeared in the Federal Register, February 16, 1966, follows:

Title 50—WILDLIFE AND FISHERIES

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBCHAPTER G—PROCESSED FISHERY PRODUCTS, PROCESSED PRODUCTS THEREOF, AND CERTAIN OTHER PROCESSED FOOD PRODUCTS

PART 262—U.S. STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP

On Tuesday, August 3, 1965, there was published in the FEDERAL REGISTER, pages 9644-9647, inclusive, Part 262—U.S. Standards for Grades of Frozen Raw Breaded Shrimp.

This part became effective September 2, 1965, except that the requirements for uniformity, degree of dehydration and condition of coating became effective December 1, 1965. On December 9, 1965, there was published in the FEDERAL REGISTER, page 15221, a notice extending the effective date for the condition of coating factor until February 7, 1966, to give the breaded shrimp industry an opportunity to submit data supporting their position for modification of the condition of coating factor.

As a result of a review of the data presented by the breaded shrimp industry, a further extension of the effective date for the condition of coating factor is given to allow additional studies to be conducted. Accordingly this factor shall become effective at the beginning of the 60th calendar day after February 7, 1966.

Breaded shrimp inspected and graded in accordance with the revised Part 262 as published in the August 3, 1965, FEDERAL REGISTER (30 F.R. 9644) between February 7, 1966, and April 8, 1966, shall meet the requirements for condition of coating as provided in Part 262—U.S. Grade Standards for Raw Breaded Shrimp and published in the FEDERAL REGISTER (25 F.R. 8444) dated September 1, 1960, as amended by interim regulations published on page 7444 of the FEDERAL REGISTER dated June 5, 1965.

HAROLD E. CROWTHER,
Acting Director.

FEBRUARY 10, 1966.

Note: See Commercial Fisheries Review, February 1966 p. 88.

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UDALL CONGRATULATES BUREAU ON ITS 95th ANNIVERSARY:

Secretary of the Interior Stewart L. Udall congratulated the Bureau of Commercial Fisheries, which observed its 95th anniversary in February 1966. In a message to Donald L. McKernan, Bureau Director, Secretary Udall said:

"Please extend my best wishes to all employees of the Bureau of Commercial Fisheries--to those aboard exploratory vessels at sea, in the laboratories, and in offices here and abroad.

"Since the creation by Congress in 1871 of a one-man fisheries commission, the Bureau of Commercial Fisheries has made many notable contributions to the Nation and to all aspects of its fishing industry.

"The Department of the Interior is proud of the record established by the Bureau in science, technology and resource development. This has been done with the Bureau's primary mission always uppermost--service to the Nation and industry, without depleting the fishery resources."

Responding to Secretary Udall's message, Director McKernan said:

"The five years remaining until we observe our one-hundredth anniversary can be the most outstanding in the Bureau's history. Our scientists estimate that the harvest from the ocean waters near our coast can be increased fivefold. If our fishing industry can achieve this goal, it will provide an important economic benefit to the Nation, and help feed the hungry billions of the world. We fully expect the fish protein concentrate we have developed to be a large factor in helping combat malnutrition in developing countries.

"The Bureau has the human and technical resources to make the next five years memorable."

Department of the Treasury

BUREAU OF CUSTOMS

GROUNDFISH FILLET IMPORT TARIFF-RATE QUOTA FOR 1966:

The reduced-tariff-rate import quota on fresh and frozen groundfish (cod, haddock, hake, pollock, cusk, and ocean perch) fillets and steaks for calendar year 1966 is 23,591,432 pounds, the Bureau of Customs announced in

the February 8, 1966, Federal Register. Divided into quarterly quotas this means that 5,897,858 pounds of groundfish fillets and steaks during each quarter of 1966 may be imported at the $1\frac{7}{8}$ cents-per-pound rate of duty and any imports over the quarterly quota will be dutiable at the rate of $2\frac{1}{2}$ cents a pound.

Reduced Tariff-Rate Import Quota for Fresh and Frozen Groundfish Fillets, 1954-1966

Year	Quota	Year	Quota
	1,000 Lbs.		1,000 Lbs.
1966	23,591	1960	36,533
1965	24,384	1959	36,920
1964	24,862	1958	35,892
1963	24,875	1957	37,376
1962	28,571	1956	35,197
1961	32,601	1955	35,433
		1954	33,950

The reduced-rate import quota for 1966 is 3.2 percent less than the 1965 quota of 24,383,589 pounds. From 1951 to 1960 the quantity of fresh and frozen groundfish fillets permitted to enter the United States at the reduced rate of duty of $1\frac{7}{8}$ cents a pound had increased 24.7 percent, but in 1961 the trend was reversed significantly for the first time because in 1960 frozen fish fillet blocks with bits and pieces were no longer duitable under the Tariff category of "frozen groundfish fillets."

Average aggregate apparent annual consumption in the United States of fresh and frozen groundfish fillets and steaks (including the fillet blocks and slabs used in the manufacture of fish sticks, but excluding fish blocks since September 15, 1959, and blocks of fish bits) for the three years (1963-65) preceding 1966 was 157,276,216 pounds, calculated in accordance with headnote 1, Part 3A, Schedule 1, under item 110.50, of the Tariff Schedules of the United States. This was far below the consumption of 217,337,633 pounds in 1958-60 and 243,554,480 pounds for 1957-59.

The notice as it appeared in the Federal Register of February 8, 1966 follows:

DEPARTMENT OF THE TREASURY

Bureau of Customs

[T.D. 66-27]

TARIFF-RATE QUOTA FOR CERTAIN FISH

Calendar Year 1966

FEBRUARY 2, 1966.

In accordance with item 110.50 of part 3, schedule 1, Tariff Schedules of the United States, it has been ascertained that the average aggregate apparent annual consumption in the United States of fish, fresh, chilled, or frozen, fillets, steaks, and sticks, of cod, cusk, haddock, hake, pollock, and rosefish, in the 3 years preceding 1966, calculated in the manner provided for in headnote 1, part 3A, schedule 1, was 157,276,216 pounds. The quantity of such fish that may be imported for consumption during the calendar year 1966 at the reduced rate of duty under item 110.50 is, therefore, 23,591,432 pounds.

[SEAL] EDWIN F. RAINS,
Acting Commissioner of Customs.

Note: See Commercial Fisheries Review, April 1965 p. 93.

Eighty-Ninth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

ALASKAN SALMON FISHERY: Sen. Gruening inserted in Congressional Record, Feb. 25, 1966 (pp. 3969-3970), an article that appeared in the Feb. 1966 issue of Fishermen's News titled "Prince William Sound Earthquake Loss At $1 Million--Spawning Bed Damage Threatening Current, Future Pink Salmon Runs," by Lone E. Janson. The article concerns the far-reaching devastation of the fisheries in Prince William Sound that occurred in the Alaska earthquake of March 1964.

ANTIDUMPING ACT AMENDMENT: Rep. Nedzi in extension of his remarks inserted in Congressional Record, Mar. 1, 1966 (pp. A1047-A1049), an article titled "Dumping, Antitrust Policy, and Economic Power," which will appear in a forthcoming issue of Business Topics. The article contains a discussion of the implications of proposed antidumping legislation.

CLEAN RIVERS RESTORATION ACT OF 1966: Introduced in House H. R. 13104 (Fallon), H. R. 13105 (Wright), H. R. 13147 (Howard), H. R. 13165 (McCarthy) Mar. 1, 1966; introduced in Senate S. 2987 Feb. 28, 1966, to provide a program of pollution control and abatement in selected river basins of the United States through comprehensive planning and financial assistance, as amended, and for other purposes; to Committee on Public Works. Same day both Houses received a letter from the Secretary of the Interior transmitting a draft of proposed legislation.

Rep. Fallon in Congressional Record, Feb. 28, 1966 (p. 4047), pointed out that this bill would provide for the cleaning up of our Nation's lakes, streams, rivers, and harbors on a wide-scale basis.

Sen. Muskie in Congressional Record, Feb. 28, 1966 (pp. 4057-4061), pointed out that there are three principal features in the administration bill; one provides

for the development of coordinated pollution control and abatement programs in selected river basins; the second is a tightening of enforcement procedures; and the third provides for some increase in Federal assistance for sewage treatment construction, an increase in Federal assistance in State pollution control programs, and an increase in the authorization for Federal water pollution control research.

COMMODITY PACKAGING AND LABELING: Introduced in House H. R. 12759 (Farnum), Feb. 10, 1966, and H. R. 12977 (Wm. D. Ford), Feb. 23, 1966, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling certain consumer commodities distributed in such commerce, and for other purposes; to Committee on Interstate and Foreign Commerce. Similar to S. 985.

FISHERIES: Sen. Bartlett inserted in Congressional Record, Feb. 10, 1966 (pp. 2825-2826), an article from the January 1966 anniversary issue of the Fishermen's News titled "High Seas Fishery Conservation--1965" by Sen. Warren G. Magnuson.

Rep. Sikes inserted in Congressional Record, Feb. 14, 1966 (pp. A713-A714), an article from the Jan. 31 issue of Sports Illustrated titled "Plenty of Fish In The Sea?" by Martin Kane.

Sen. Robertson, Congressional Record, Feb. 21, 1966 (pp. 3399-3400), spoke in the Senate regarding an article titled "Plenty of Fish In The Sea?" which appeared in the Jan. 31, 1966 issue of Sports Illustrated. He stated that he sent this article to the Secretary of the Interior, and today he inserted in the Record the reply to his letter from Deputy Director Abram V. Tunison of the Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife.

FISH HATCHERIES - OREGON: Senate Feb. 24, 1966, received a letter from the Acting Comptroller General of the United States, transmitting, pursuant to law, a report on review of cost-sharing arrangements with the State of Oregon for the operations of fish hatcheries, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Department of the Interior, dated Feb. 1966 (with accompanying report); to Committee on Government Operations.

FISH PROTEIN CONCENTRATE PLANTS: Sen. Bartlett, Congressional Record, Feb. 16, 1966 (pp. 2975-2976), spoke from the floor of the Senate concerning the National Academy of Sciences' endorsement and support of a fish protein concentrate as contained in his bill, S. 2720; and as mentioned in President Johnson's food-for-freedom message to Congress. He inserted in the Record a copy of the letter from Frederick Sertz, president of the National Academy of Sciences, dated Dec. 1, 1965, addressed to Secretary Udall on this matter; a copy of the resolution adopted by the Advisory Committee on Marine Protein Resource Development of the National Academy of Sciences, recommending the construction of a suitable pilot plant for fish protein concentrate; and the committee's statement concerning the commercial production of a wholesome protein concentrate made from whole fish for human consumption.

Sen. Kennedy (Mass.) spoke in the Senate (Congressional Record, Mar. 1, 1966, pp. 4157-4159) concerning the use of fish protein concentrate as a food supplement to alleviate world hunger. He listed the following as some of the immediate advantages of full-scale production of FPC: would allow year-round fishing for fishermen; stabilize and diversify the fish market; increase employment in fish processing plants; and increase work for shipbuilders. The Senator proposed a six-point action program to insure that fish protein concentrate is put to work quickly and effectively as follows: (1) obtain approval by the Food and Drug Administration for the commercial marketing of FPC; (2) obtain passage of Sen. Bartlett's bill (S. 2720), providing for the construction of experimental plants to produce fish protein concentrate; (3) institute a series of technical studies, through authority already existing under present law, for the design of a processing plant small enough to be carried on board ship; (4) use resources of private industry in the behalf of FPC future research and exploitation; (5) establish a coordinating link between the Department of the Interior's Bureau of Commercial Fisheries and the Office of Economic Opportunity so that once FPC is approved by the FDA for domestic consumption, the product could be made immediately available in the war on poverty; and (6) include FPC in our food-for-freedom program.

Rep. Hanna in extension of remarks in Congressional Record, Mar. 1, 1966 (pp. 4237-4238), asked that his fellow members join him in urging swift and favorable action of the Food and Drug Administration on a Department of the Interior petition for clearance of fish protein concentrate as an acceptable food additive.

FUR SEAL CONSERVATION AND PRIBILOF ISLANDS ADMINISTRATION: The Senate Committee on Commerce, Feb. 18, 1966, resumed its hearings on S. 2102, to protect and conserve fur seals on the Pribilof Islands, having as a witness Donald F. McKernan, Director, Bureau of Commercial Fisheries, Department of the Interior. Hearings adjourned subject to call.

METRIC SYSTEM STUDY: House Committee on Science and Astronautics Feb. 17, 1966, reported (H. Rept. 1291) with amendment, S. 774, an act to authorize the Secretary of Commerce to make a study to determine the advantages and disadvantages of increased use of the metric system in the United States.

H. Rept. 1291, authorizing the Secretary of Commerce to make a study to determine the advantages and disadvantages of increased use of the metric system in the United States (Feb. 17, 1966, report from the Committee on Science and Astronautics, House of Representatives, 89th Congress, 2nd session, to accompany S. 774), 6 pp., printed. Committee reported bill favorably with an amendment. Discusses explanation of amendment, purpose and explanation of bill, cost and budget data, departmental recommendations; also presents the views of Rep. John W. Wydler.

The Metric Study Bill: Hearings before the Committee on Science and Astronautics, U. S. House of Representatives, 89th Congress, 2nd session, on S. 774, January 18, 1966, 11 pp., printed. Contains statement of Dr. J. Herbert Holloman, Assistant Secretary for Science and Technology, Department of Commerce, accompanied by Gordon Christenson, Assistant General Counsel.

OCEANOGRAPHY: Sen. Magnuson inserted in Congressional Record, Feb. 10, 1966 (pp, 2838-2839), a speech titled "Government and Industry--Partners in Oceanography," given on Jan. 27, 1966, by Rear Adm. O. D. Waters, Jr., oceanographer of the Navy, before the Ocean Science and Technology Advisory Committee and the Oceanography Subcommittee of the Antisubma-

rine Warfare Committee of the National Security Industrial Association.

SHRIMP: Rep. Edwards inserted in Congressional Record, Feb. 21, 1966 (p. A849), a recent Fish and Wildlife Service release titled "Shrimp Dishes Grow in Popularity." This article recognizes the growing shrimp industry and highlights the facts that southwest Alabama shrimpers are a major part of this growth.

TRADE EXPANSION ACT AMENDMENT: H. R. 12756 (Curtis) introduced in House Feb. 10, 1966, to amend the Trade Expansion Act of 1962 to provide that the President's annual report to Congress shall be submitted on or before March 31 of each year; to Committee on Ways and Means. Rep. Curtis pointed out in Congressional Record, Feb. 10, 1966 (p. 2707), that this amendment would make explicit the intent of Congress that it have available for reference and use early in each year the President's report on trade for the previous year. He stated that the trade report is not only an important document through which the Congress can judge the operations of the Executive in this important field, it is also necessary for congressional decision-making. He also stated that the trade report can be an important vehicle for public information, especially at present when U. S. international trade negotiations (Kennedy Round) are widely followed and the subject of public interest.

WATER POLLUTION: Hon. Blatnik inserted in Congressional Record, Feb. 17, 1966 (pp. A794-A796), a speech delivered Jan. 18, 1966, at the Clean Water Conference of the Michigan State Association of Supervisors, titled "Water Pollution in Michigan--A Way To Its Solution," by Hon. John Dingell.

Rep. Howard inserted in Congressional Record, Feb. 17, 1966 (pp. A832-A833), an address by Rep. Blatnik, Feb. 17, 1966, before the Midwest Governor's Conference, Lexington, Kentucky, titled "The Surge for Clean Water."

S. 2947 (Muskie and 17 others) introduced in Senate Feb. 18, 1966, to amend the Federal Water Pollution Control Act in order to improve and make more effective certain programs pursuant to such act; to Committee on Public Works. Sen. Muskie pointed out in Congressional Record, Feb. 18, 1966 (pp. 3310-3312), that the bill makes the following provisions: provides for a 6-year, $6 billion program of grants to municipalities for sewage treatment construction cost; provides for incentives to the States to participate in the program by offering a 10-percent bonus on those grants in cases where the State matches the Federal contribution; provides for an increase from $5 million to $10 million in the grants for State programs; and authorizes a $25 million a year program of grants for the demonstration of advanced waste treatment and water purification methods or new or improved methods of compatible joint treatment systems for municipal and industrial wastes.

Both Houses Feb. 23, 1966, received the President's message, transmitting legislative recommendations with respect to water and air pollution, parks and recreation, and other phases of natural resources. Among other things, the message contains a statement concerning the submission to the Congress of a reorganization plan to transfer to the Department of the Interior the Water Pollution Control Administration now housed in the Department of Health, Education, and Welfare. The text of the message (H. Doc. 387) is printed in Congressional Record, Feb. 23, 1966 (pp. 3519-3522).

Rep. McCarthy in extension of his remarks inserted in Congressional Record, Mar. 1, 1966 (pp. A1065-A1066), an article which appeared in the Feb. 25 edition of the New York Times titled "The Clear Water Fight: President Casts Himself As Referee, Wielding A Big Carrot And A Big Stick," by Mr. Gladwin Hill.

H. R. 13162 (Dingell) and H. R. 13179 (Wright) introduced in House Mar. 1, 1966, to amend the Federal Water Pollution Control Act in order to improve and make more effective certain programs pursuant to such act; to Committee on Public Works.

H. R. 13235 (Resnick) introduced in House Mar. 2, 1966, to expand and improve existing law and to provide for the establishment of regulations for the purpose of controlling pollution from vessels and certain other sources in the Great Lakes and other navigable waters of the United States; to Committee on Merchant Marine and Fisheries. Similar to H. R. 7976.

WATER RESOURCES RESEARCH: The Subcommittee on Irrigation and Reclamation of the House Committee on Interior and Insular Affairs, Feb. 14, 1966, continued hearings on S. 22, and related bills, to promote a more adequate national program of water research. Hearings continued Feb. 15.

WORLD HUNGER--PRESIDENT'S MESSAGE ON FOOD FOR FREEDOM: Both Houses Feb. 10, 1966, received the President's message transmitting his legislative recommendations for worldwide war on hunger. At one point in his speech, in Congressional Record, Feb. 10, 1966 (pp. 2703-2709), the President stated that modern science must be directed to the fight against malnutrition and that he has directed the President's Science Advisory Committee to work with the very best talent in this Nation to search out new ways to develop inexpensive, high-quality synthetic foods as dietary supplements. He stated that "a promising start has already been made in isolating protein sources from fish, which are in plentiful supply throughout the world." The message was ordered printed as a House document (H. Doc. 378), and referred to the House Committee on Agriculture and the Senate Committee on Agriculture and Forestry.

H. Doc. 378, A War On Hunger: Message from the President of the United States relative to A War On Hunger, referred to Committee on Agriculture, House of Representatives, 89th Congress, 2nd Session, Feb. 10, 1966, 8 pp., printed.

H. R. 12785 (Cooley) introduced in House Feb. 14, 1966, to combat hunger and malnutrition, to further economic development and for other purposes; to Committee on Agriculture.

House Committee on Agriculture, Feb. 15, 1966, began hearings on the world population explosion and war on hunger program.

Senate Feb. 16, 1966, received a letter from the Acting Secretary of Agriculture, transmitting a draft of proposed legislation to promote international trade in agricultural commodities, to combat hunger and malnutrition, to further economic development, and for other purposes (with an accompanying paper); to Committee on Agriculture and Forestry.

S. 2933 (Ellender) introduced in Senate Feb. 17, 1966, to promote international trade in agricultural commod-

ities, to combat hunger and malnutrition, to further economic development, and for other purposes; to Committee on Agriculture and Forestry. Similar to H. R. 12785. Sen. Ellender speaking from the floor of the Senate stated that the above mentioned committee will begin hearings on this bill on Mar. 1, 1966. He inserted in Congressional Record, Feb. 17, 1966 (p. 3205), a short explanation of the bill which states that the bill authorizes a 5-year program for furnishing food aid abroad to replace Public Law 480 when it expires on Dec. 31, 1966.

Sen. Bartlett in Congressional Record, Feb. 18, 1966 (p. 3280), submitted an amendment (No. 485) to S. 2933, to promote international trade in agricultural commodities, to combat hunger and malnutrition, to further economic development, and for other purposes. The amendment adds domestic fishery products to the President's food-for-freedom program. Sen. Bartlett stated that he was pleased that the new food-for-freedom program is not dependent on our offering only surplus products to needy, friendly nations because this restriction has prevented fishery products from being sold under the food-for-peace program simply because the Secretary of the Interior never determined that any domestic fishery product was in surplus. He further stated that under the amendment the financing of fishery products would be the same as under the present law; namely CCC funds. He emphasized that fish protein concentrate is already included in the legislation since authority is in the bill to use CCC funds for the acquisition of additives and for the cost of enrichment and fortification.

Senate Committee on Agriculture and Forestry began hearings Mar. 2, 1966, on S. 2933.

Rep. Hanna in extension of his remarks inserted in Congressional Record, Feb. 21, 1966 (p. A868), an editorial from the Feb. 13, Los Angeles Times, titled "Food For Freedom and Survival."

Rep. Garmatz inserted in Congressional Record, Feb. 21, 1966 (p. A877), an editorial from the Baltimore Sun titled "Food Message."

Rep. Cooley in extension of his remarks inserted in Congressional Record, Feb. 23, 1966 (pp. A935-A939), the statement given by the Secretary of Agriculture at hearings before the House Committee on Agriculture.

Sen. McGovern inserted in Congressional Record, Mar. 1, 1966 (p. 4157), an editorial which appeared in the March issue of the Farm Journal, titled "Good Hunger Program." The editorial strongly endorses President Johnson's new food-for-freedom program.

Senate Committee on Agriculture and Forestry began hearings Mar. 2, 1966 on S. 2826, to amend the Agricultural Trade Development and Assistance Act of 1954, as amended in order to encourage and stimulate increases in the food and agricultural production of developing nations receiving assistance under such act, to facilitate increased United States efforts to meet the threat of growing human hunger and malnutrition and for other purposes.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS: The U. S. Department of the Interior's Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL-3 "Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, U. S. Department of the Interior, Bureau of Commercial Fisheries, 1815 N. Fort Myer Drive, Rm. 510, Arlington, Va. 22209.

Editorial Assistants: Ruth V. Keefe and Jean Zalevsky

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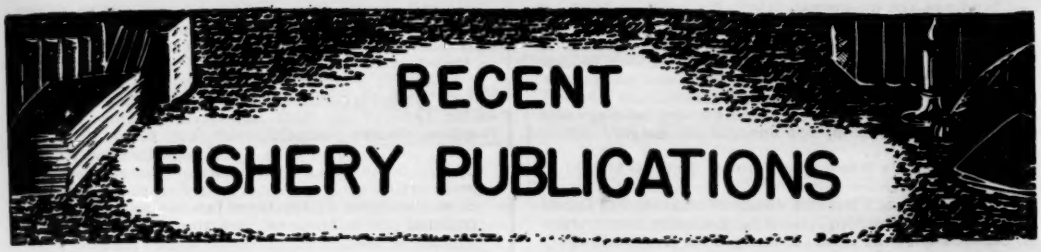

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CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number — Title

CFS-3975 - Gulf Coast Shrimp Data, May 1965, 21 pp.
CFS-3984 - Michigan, Ohio & Wisconsin Landings, September 1965, 4 pp.
CFS-4002 - Pacific Coast Fisheries, 1964 Annual Summary, 12 pp.
CFS-4005 - Fish Meal and Oil, November 1965, 2 pp.
CFS-4008 - Gulf Coast Shrimp Data, June 1965, 22 pp.
CFS-4009 - Gulf Coast Shrimp Data, July 1965, 19 pp.
CFS-4012 - Alabama Landings, October 1965, 3 pp.
CFS-4014 - Massachusetts Landings, July 1965, 9 pp.
CFS-4015 - Massachusetts Landings, August 1965, 10 pp.
CFS-4016 - Louisiana Landings, November 1965, 3 pp.
CFS-4017 - Mississippi Landings, October 1965, 3 pp.
CFS-4019 - New Jersey Landings, November 1965, 3 pp.
CFS-4021 - New York Landings, October 1965, 4 pp.
CFS-4022 - New York Landings, November 1965, 4 pp.
CFS-4023 - Shrimp Landings, August 1965, 5 pp.
CFS-4024 - Gulf Coast Shrimp Data, August 1965, 19 pp.
CFS-4027 - Maine Landings, November 1965, 4 pp.
CFS-4028 - Rhode Island Landings, October 1965, 3 pp.
CFS-4029 - Texas Landings, November 1965, 3 pp.
CFS-4032 - Shrimp Landings, September 1965, 5 pp.
CFS-4034 - Fish Sticks, Fish Portions, and Breaded Shrimp, October-December 1965, 3 pp.
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New England Fisheries--Monthly Summary, January 1966, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery

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New York City's Wholesale Fishery Trade--Monthly Summary--December 1965, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

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Seattle--Landings, Receipts, and Values of Fishery Products, 1965 (Preliminary), by V. J. Samson, 19 pp., January 31, 1966. (Fishery Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Building, Seattle, Wash. 98104.) Reviews Pacific Northwest fisheries trends and their effect upon Seattle fishery receipts for 1965. Contains statistical tables on landings by U. S. halibut fleet; Seattle's landings and receipts of fishery products; carload and truckload shipments of fishery products by months; imports of canned fishery products; receipts of Alaska canned fish and shellfish; and names, classifications, and approximate standards as used on Seattle Wholesale Market.

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10, no. 11, November 1965, pp. 33-34 and 56, illus., printed, $1. Editorial, Advertising and Circulation Offices, 624 Gravier St., New Orleans, La. 70150. A pioneering effort by a New Jersey yard brings a new dimension to commercial fishing vessel design and demonstrates several innovations in equipment for handling various types of fishing gear.

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RED COLOR OF SHELLFISH STUDIED BY ALASKAN LABORATORY

Color is probably the most important criteria in eye appeal in a food market. Housewives want green peas, red salmon, pink shrimp, and scarlet crab. Certain colors count; a few are forbidden. So color has become an important factor in marketing fish and shellfish. So say chemists of the U. S. Bureau of Commercial Fisheries Technology Laboratory at Ketchikan, Alaska.

Trying to learn how to retain the natural red color in Alaskan shrimp and crab during processing is one of the current projects of the Ketchikan Laboratory. As the nature of the carotenoid pigments causing red and orange colors is not fully understood, the problem is difficult.

The purpose of the Technology Laboratory at Ketchikan is to assist processors to turn out a quality product as well as an economic one. The laboratory employs 5 chemists and 3 assistants. It has been in operation since 1940. It operates under the regional office of the U. S. Bureau of Commercial Fisheries in Juneau, Alaska.

YEAR-LONG STUDY OF GULF STREAM

A year-long study of the Gulf Stream--the most extensive since Benjamin Franklin first studied the mysterious "ocean river" nearly two centuries ago--was started early in July 1965. Two oceanographic research vessels launched the lengthy and painstaking study. They left Norfolk, Va., and Savannah, Ga. With the latest devices of modern science, an effort will be made to unlock the secrets of the massive but elusive stream in the Atlantic Ocean. The vessels are the Explorer and the Peirce, two vessels of the "white fleet" of the Coast and Geodetic Survey, U. S. Department of Commerce.

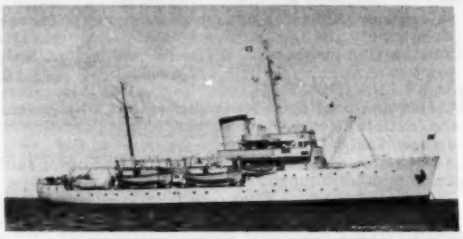

Fig. 1 - U.S. Coast and Geodetic Survey oceanographic research vessel Explorer.

Participating in the undertaking, as the study continues, will also be Weather Bureau aircraft. Other participants will be the Massachusetts Institute of Technology, Woods Hole (Mass.) Oceanographic Institution, the University of Rhode Island, Columbia University, the University of Miami, and the Lerner Marine Laboratory at Bimini, in the Bahamas. These will furnish scientists or vessels, in some instances both, for the study. Additional organizations may join in later.

The ambitious undertaking is designed to enable oceanographers to predict changes in the strength and flow of the constantly-changing stream. Out of this may come better predictions of weather over the large area affected by the Stream and of fishery conditions.

The study's project director describes the Gulf Stream as "the major oceanographic phenomenon closest to the U. S." Commenting on the scope of the program, he said: "The Gulf Stream must be clearly understood so that its role can be evaluated in weather modification, fisheries utilization, and commerce. The Stream is apparently quite variable, not only in its speed, but in its location. The Stream's major axis between the Straits of Florida and Cape Hatteras, N. C., is known to migrate closer and farther from the coast. Northeast of Cape Hatteras, the Stream is not a straight flowing 'river in the sea,' but often forms great looping meanders. It is known that these meanders change position with time but it is not known how fast they do so or what the underlying causes might be."

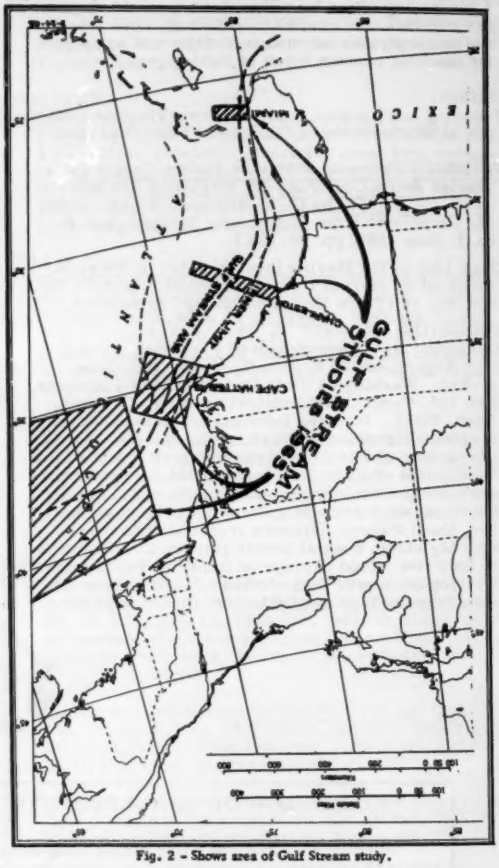

Fig. 2 - Shows area of Gulf Stream study.

The oceanographers will concentrate their study off Miami, Fla.; in the area between the Straits of Florida and Cape Hatteras off Charleston, S. C.; and in the North Atlantic from Cape Hatteras out into the ocean to the area south of Nova Scotia.

The Explorer's task will be to map the Gulf Stream in the North Atlantic to determine whether there is a regular pattern to changes in the Stream's meanders.

The Peirce, which is based at Savannah, has been assigned the task of determining the volume and pattern of water carried by the Gulf Stream off Charleston, S. C.

When the study is completed science will have a much better understanding of the great stream which, when it leaves the Straits of Florida, is like a mighty river 40 miles wide, 2,000 feet deep, discharging one hundred billion tons of water each hour. It has been calculated that the Gulf Stream carries each hour 22 times as much water into the sea as all the water discharged by all the rivers of the world in a similar period. (U. S. Coast and Geodetic Survey, July 11, 1965.)

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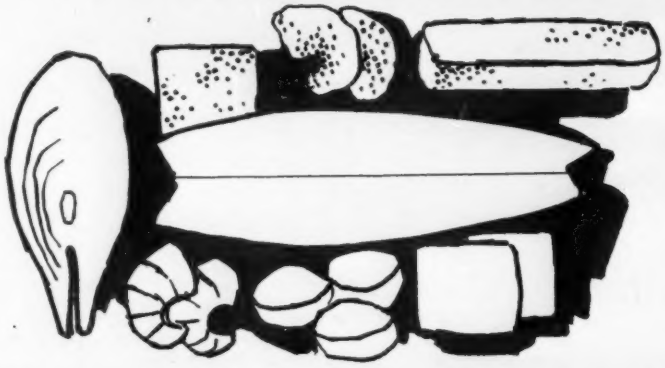
14 STANDARDS ON FISHERY PRODUCTS



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